



WHITHER  
INDUSTRIAL INDIA ?  
BEING A  
COLLECTION OF STATISTICAL DATA  
OF  
INDIAN  
INDUSTRIES, TRADE, COMMERCE,  
AGRICULTURE, POPULATION,  
FOOD-STUFFS, Etc.

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BY  
N. N. GODBOLE, M.A., B. Sc., Ph. D. (Berlin).  
*Principal, College of Technology,*  
*HINDU UNIVERSITY, BENARES.*

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*(Foreign ; Ten Shillings.)*



## FOREWORD

There is no name more honoured in the academic world in India than that of Dr. N. N. Godbole, M.A., B.Sc., Ph.D. (Berlin) of the Department of Industrial Chemistry, in the Benares Hindu University. As is well known, the Benares Hindu University stands at the top in the matter of technological teaching, and for bringing the University to this position of distinction, Dr. Godbole deserves the highest credit. His profound knowledge of Industrial Chemistry should be harnessed to quicken the pace of industrialisation of this country and I hope in due course the country will do the needful in the matter. Dr. Godbole has now published a comprehensive study of practically every requirement of industrialisation in this country, how far these can be met from indigenous resources and how far we are still dependent on help from without. The publication of "Whither Industrial India" by this great authority will, I am quite sure, be welcome all over the country and even outside, by those interested in the economical and industrial progress of this country. The book contains a wealth of statistical data on industries, trade, commerce agriculture, population, foodstuffs and other relevant matters, and in these days of food shortage, world rehabilitation and economic progress for achieving higher standards of living, the publication should become a household favourite

Rangoon  
1st, June 1946.

JAMNADAS MEHTA,  
(Bar-at-Law).



## INTRODUCTION

In the following pages, an attempt has been made to collect all the data that have a bearing directly and indirectly on the industrial progress and general prosperity of India and to present these, in a simple and intelligible manner. India has, for over a hundred years, been under a foreign rule which claims to be civilized and which has arrogated to itself the right of trusteeship over one of the culturally oldest races in the world. The all-round facts as presented herein are a clear commentary on the tall claims made and the poor results achieved. India's place in the scale of nations in all the important industries is pathetically the lowest on record even after a century of British rule. If for nothing else, at least to put a stop to a foreign policy of exploitation, India should be left politically free and economically independent to manage her own affairs. Surely, she could not fare worse!

Whereas in the figures for world population, we form about a fifth (20 %) of the human race, in the matter of industrial and commercial development, we stand on the lowest rung of the ladder. Industries like ship-building, automobiles, aeroplane and locomotive manufacture hardly exist. In the manufacture of heavy chemicals such as sulphuric acid, explosives, manures, alkalies, steel, alloys, etc., we contribute just a small percentage of the world production and that too at the end of the great war when other industrially backward countries have expanded enormously in these days.

Our food-member, Sir J. P. Srivastava defining the need for an all-India policy said, "It has been my ambition from my young days to see India a country where *every one has a square deal and four square meals a day.*" Judging from the actual data available, it is

doubtful whether the average Indian is getting *even one square meal a day, not to talk of the square deal envisaged!*

The average amount of rice, sugar, pulses, milk ghee, oils, meat, eggs, clothing etc., available per head, per day, is diabolically low! Literacy, per-cent, is one of the lowest in the world. Sanitation and medical help are very meagre. The fertility of the soil is already past the exhaustion point. The average income, per head, is one of the lowest on record.

The appendix gives certain data which were collected after the manuscript was sent to the press. The items are all arranged alphabetically and as such need neither an index nor a list of contents. It is hoped, the book will be useful to students of industry, agriculture, commerce and also as a general book of reference.

The author is grateful to the Fine Art Printers, Simla, for the good printing and the quality of paper supplied.

Benares Hindu University,  
(April 1946).

N. N. GODBOLE.

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## ACIDS

(i) Acetic, (ii) Chloro-Sulphonic (iii) Chromic (iv)  
Hydrochoric (v) Oxalic (vi) Sulphuric.

### ACETIC ACID

The demand for acetic acid during war period is estimated at 800 tons a year. The Mysore plant at Bhadravati has a capacity of 200 tons annually but the actual (reached) production of acetic acid reached the limit of only 60 tons a year. A large part of this was sold as calcium acetate for the manufacture of acetone. As early as 1923-24, one of the Directors of the Bhadravati wood distillation plant was despatched to Germany to find a market for methyl alcohol and acetic acid, just then the Germans had perfected the manufacture of methyl alcohol synthetically, and therefore, no contract could be made. The Mysore Government is now trying to put up a plant with a capacity of 600 tons a year. Messrs Parry & Co. of Madras too are arranging to put up at Government cost a plant with a capacity of 150 tons a year. Acetic acid can also be manufactured from the fermentation of molasses to alcohol and its further oxidation to acetic acid. This is a rich source for us in India where a large quantity of molasses is being wasted to day.

### CHLORO-SULPHONIC ACID

This compound deserves special mention because it has been produced during war by only one concern in India. The Mysore chemical and fertiliser Company is manufacturing only 2 tons a month of this article at Belagoda, Mysore state. Fuming sulphuric acid plays an important part in its manufacture.

This is used for chrome plating. Three four firms are producing this in India, their total annual production being 100 tons. This capacity is developed during the war period and is more than sufficient to meet defence demands. This has been possible because of the production of dichromates in India, also, during the war period.

### HYDROCHLORIC ACID

The total production of hydrochloric acid is estimated at 460 tons per year. The various sulphuric acid factories are producing this from their own acid and common salt to meet their demands. Attempts are being made to produce hydrochloric acid synthetically from hydrogen and chlorine by the electrolysis of common salt, wherever there is a surplus, e. g. at Dalmianagar.

### OXALIC ACID

Before the war, there was no production of oxalic acid in India. The demand for this is about 100 tons a year. The production of this acid has been necessitated by the demand made by the recent war, by a costly process from the bark of Terminalia Arjuna and about 35 tons a year are produced by this method; for economical production, it must be made by the fusion method from saw dust and alkali. Certain factories, such as Rohtas Industries Ltd. at Dalmianagar are working this method.

### SULPHURIC ACID (cf. Sulphuric acid)

The production of this acid in India is being carried on both by extremely crude as well as extremely modern contact processes. The high cost of

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transport charged by Indian railways is a factor in favour of the very crude methods. The production of sulphuric acid (estimated as 100%) in 1932-33 was 24,200 tons, in 1940-41 it was 39,000 tons and in 1943 it went up to 73,500 tons. Of this last amount, 19,000 tons were used for the manufacture of ammonium sulphate and only 700 tons were used for the manufacture of super-phosphates. The world production of sulphuric acid is calculated to be about 12,000,000 (twelve million) tons; of this U.S.A. produces 4,000,000 (four million) tons, England produced 1,000,000 (one million) tons, Germany produced 2,000,000 (2 million) tons and Japan 1,700,000 (1.7 million) tons. Sulphuric acid is an index of the industrial development of a country and judged from this standard, India's contribution to the industrial progress of the world comes to hardly 0.5% of the whole.

### ACETONE

The normal pre-war demand for this very important solvent was only about 25 tons a year. Because the solvent is not to be had, therefore, many industries could not be started. When the war broke out, it was very badly needed for ammunition factories. At Aruvankadu, Nilgiris, about 140 tons of acetone are being manufactured from calcium acetate obtained from Bhadravati Wood distillation plant. The cordite factory at Aruvankadu is also making about 700 tons a year from a plant imported to make acetone from alcohol. It should be noted that during the last war, the Government distillery at Nasik manufactured a large amount of acetone by a special fermentation process from grains (carbohydrates).

### “AG-MARK” PRODUCTS

Certain standardised products are being marketed under Government supervision with the ‘AG mark’

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brand. Articles like ghee, vegetable oil and other agricultural products are included in this list. From a small beginning of Rs. 25000/- only, the volume of trade has come up to 5½ crores of rupees under provincial and state control.

## ALCOHOL (see Distilleries)

The manufacture of alcohol is a state monopoly and is under the excise department. It is sold as rectified spirit 90%, 96% or 99.8% (absolute alcohol or power alcohol). The last of these can be used to the extent of 20% in mixing with petrol as used for motor cars. The consumption of petrol in India is about 100 million gallons; this means that India can stop the import of petrol to the extent of 20 million gallons. This has not been done as yet. This is a prewar estimate.

The estimated production of molasses in India as a bye-product from the sugar industry is estimated at 250 thousand tons annually. If this is converted into alcohol, we can produce 37 million gallons of alcohol. Mahuwa flowers in India are another important source for the manufacture of alcohol, therefore our maximum production capacity is of the order of 40 million gallons of alcohol of about 96% strength.

Absolute (power) alcohol is being produced in four factories in India, according to a recent statement made in the legislative assembly, to the extent of  $1\frac{3}{4}$  to  $2\frac{1}{2}$  million gallons only per year (for mixing with petrol), the excuse put forward being that machinery ordered from America in 1941 is still coming ! India needs about 20 million gallons of this absolute alcohol for mixing with petrol as given above. Obviously, there is someone interested in the sale of imported petrol.

The total production of alcohol in the year 1942-43

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was about 10.6 million gallons of which more than one third was used for war purposes. There are about fifteen distilleries in India. The conversion of alcohol into acetic acid & its further conversion into acetic anhydride would lead to the establishing of the cellulose acetate industry. In Europe, this is an expensive cellulose derivative but for us in India this will be both cheap & extremely valuable. At present the cheapest method is viscose but for us this acetate derivative would be an achievement.

## ALUMINIUM

Aluminium is a very valuable & useful metal with all its draw-backs. The changes in the prices of aluminium & its production are very interesting. The production of aluminium in 1854 was hardly 45 lbs! and its price was Rs. 900 per lb! Its production in 1888 was about 4 tons & the price was about Rs. 18/- per lb & in 1936 its production was over three & a half lakhs of tons and the price fell down to As. 10 only per lb! India's needs are at present annually about 5000 tons but the demand is soon expected to go up to ten times this figure. There are only two factories in India making aluminium today, one American concern at Alwaye in Travancore State and the other at Asansol in Behar. The projected output of the Alupuram factory near Alwaye is about 5000 tons per year & its present production with imported Aluminium Oxide is supposed to be about 1000 tons per year and the Asansole factory is expected to produce about 1200 tons per year. It is expected that the American concern will be a serious rival to the Indian concern because the secrets of the process of the manufacture of aluminium are very closely guarded and the Indian concern will have a very hard time before it expects to overcome the

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manufacturing difficulties. The Indian Government will have to come to its rescue as this will be the first Indian concern of its kind and the industry must be protected and fostered. One peculiarity of the Indian aluminium ore (bauxite) is that it contains about 40% of titanium oxide which is a useful and valuable pigment and an easy bye-product! Therefore it is possible to have (at the rate of 1 ton per 10 tons of aluminium produced), one tenth of the actual production of aluminium, titanium oxide, as a bye-product.

In 1936, Germany had topped the list of aluminium producing countries with 98,000 tons of production and the total world consumption of aluminium is supposed to reach the figure of nearly 2 million tons. India has taken up this industry only during the war.

### AMMONIA (Synthetic)

Ammonia and Ammonium salts can be obtained as bye-products in coal distillation. In the whole of India, there are hardly three cities which manufacture coal-gas (like Bombay and Calcutta). Else-where, coal-gas is a common commodity supplied for domestic use just like water. Per ton of coal distilled, nearly 11 Kgs. (about 23 lbs) of ammonium sulphate or 6 lbs of ammonia gas are available. Already at Calcutta & at Tatanagar (Jamshedpur), appreciable quantities of this are manufactured from the bye-products of the coke oven plants. In the Bombay coalgas company, it appears the gas liquor (which contains the ammonia) is conveniently let off into the city drains. Such municipal units must be managed by municipalities themselves and should not be allowed to be run by private concerns which care more for profit than for convenience or economy.

The only place where synthetic ammonia is

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manufactured today is at Belagoda (Mysore State) where an American plant is established with a capacity of 1400 tons, worked by a modified Haber- Bosch process. Of this, we are told nearly 1000 tons are used up for war works and only 400 tons are used for ammonium sulphate. Sulphur required for this is imported from U.S.A.

## AMMONIUM SULPHATE (See fertilizers)

Ammonium sulphate is an important manure and is being used all over the world with excellent results. It is only in India (a big agricultural country) that the amount of ammonium sulphate used is ridiculously low! The two important manures essential for crops are (apart from potassium salts) ammonium sulphate and (calcium) superphosphates. For India, these should be required in millions of tons where-as we are using them, at best, in thousands of tons!

The following are some interesting figures for India for ammonium sulphate.

	1938-39	1942-43
Imports	76,748 tons ;	1,351 tons only ;
Indian production	14,860 tons ;	25,000 tons
<hr/>		
Total tons	91,608	.....
less exports	1,318	.....
<hr/>		
Tons	90,290 tons	Total 26421 tons.

Rice area alone (20,000000 acres of irrigated land!) at the modest rate of even one cwt. per acre would require one million tons of ammonium sulphate per year for only one local crop and one million tons of

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superphosphates also ! A small country like Egypt is using annually 500,000 tons of fertilizers. The market price of ammonium sulphate in 38-39 was Rs. 108/- per ton and in 42-43 it was Rs. 260 per ton.

The Government of India is considering new schemes for the production of nearly 350,000 tons of ammonium sulphate. There is a furious controversy over the investment of the capital and the sites to be selected for establishing these factories. The qualifications of the experts are questioned. The rate of production also is a matter of controversy, the reason being that whereas the imported ammonium sulphate (mostly from England) was actually sold in the Indian market at about Rs. 110/- per ton, the rate of production in India is estimated to be about 50% higher. That is the irony of the situation. One thing that deserves to be noted is that by supplying ammonium sulphate, in future the soils become acidic.

The production of am. sulphate in India was 8000 tons in 1932-33 and 18,000 tons in 36-37. In England, in 1937, the coalgas companies alone recovered 86,000 tons of am. sulphate as a bye-product. The Travancore Government is arranging to manufacture about 54,000 tons of ammonium sulphate within the next 18 months.

It is possible to recover under a strict national Government control several thousand tons of am. sulphate as a bye-product from (a) the coal used for preparing soft coke (b) coal used for generating electricity and (c) coal used by Railways in India. Nearly 200,000 tons of ammonium sulphate could be recovered in this manner alone as a bye-product and the price would of course be naturally low.

#### AREA (& population)

The total area of British India is roughly 866000

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sq. miles and that of Indian States is 716,000 sq. miles. Total 1,582000 sq. miles. The total area of Great Britain and Ireland is about 947000 sq. miles. The total population of British India in 1941 is given at 300,000,000, the density is 341 per sq. mile and the total population of Indian States is (in 1941) 82,000,000, the density being 130 per sq. mile. In 1921 the density of population of British India was 273, as against the density of the population in the Indian States which was only 101.

## BANKING IN INDIA.

The banking crisis in India of 1922-23 severely affected Indian banking. Then came the shock caused by the depreciation of the £ Sterling. In 1937, the bank deposits reached the figure of 109 crores.

## BIRTHS & DEATHS & AVERAGE LIFE IN INDIA (cf. population)

Between 1921 and 1941, the high rate of natural increase has been sustained largely by a fall in the infantile as well as in the general mortality rates which declined from 198 to 160 per mille (1000) and from 31 to 22 per mille respectively (1939). Births & deaths (per 1000).

	Births	Deaths
U.K.	15.8	12.2; 53
Australia	17.7	9.8; 38
U.S.A.	17.8	10.6; 41
Germany	20.3	12.3; 60
Japan	27.0	17.6; 114
India	33.0	21.8; 167
	Average Life	
Netherlands	65.4	} average for males and females to-gether
New Zealand	65.0	

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	male	female
Australia	63.5	67.1
U.S.A.	60.6	64.5
U.K.	60.2	64.4
Germany	59.9	62.8
Japan	47.0	49.6
India	26.9	26.6

(In Madras presidency, the average life is calculated to be 30).

## BOBBINS

It is remarkable that with a prosperous and flourishing trade in textile industry, India has not been able to manufacture her own bobbins but has been importing them. The two steps involved are, seasoning of the right quality of timber and working them on lathes to give the proper shape. A few intelligent mechanics should suffice to do this sort of work. It is a disgrace that India should import these. However, here are the figures.

Imports of bobbins into India,  
(mostly from Japan)

1936, Rs. 32.5 lakhs

1936, Rs. 24.2 lakhs; 1943-44, 66.4 lakhs.

1937, Rs. 23.3 , ,

During the war days, round about Haldwani, Bareilly and some other centres, some bobbins are being manufactured.

## BONES (see Superphosphates)

The export of bones and increase in its export is no great sign of prosperity. In exporting bones, we are in a way exporting the fertility of our soil. The bones should normally go back to the soil and enrich it as a manure.

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## BONES-(Exports)

	30-31	40-41
Quantity in tons	38,000	52,000 Tons
Value in Rs.	31.5 lakhs	31.0 lakhs

Converted into superphosphates, this would be of great value to our agriculture. Gelatine will also be a bye-product in this industry.

## BRUSHWARE & BRISTLES

India and China are two great suppliers of bristles. The price of bristles is fixed at Rs. 7/- per seer (2 lbs). "Brushware Ltd." in Cawnpore is one of the biggest concerns of its kind in India. There are smaller factories at Calcutta, Bombay and other places. Before 1939, the production of brushes of different kinds in Cawnpore was estimated at Rs. 83,300, only, for six months and the same production went up to Rs. 28 lakhs worth of goods for six months ending May 1942.

It is interesting to note that for brushware, the raw materials used during the war days were mostly Indian. The quantities used (1942-1943) were as follows; fibres (Indian) 11 tons; wood, 26200 cu. ft., wire 11 tons; hair  $3\frac{1}{2}$  tons; bristles 152 tons. The two items of import were English wire  $1\frac{1}{4}$  tons and Chinese bristles 12 tons.

## BUTTER (cf. ghee, milk)

The figures for the production of butter in India are very difficult to get or to calculate. Australia, Switzerland, Holland and Belgium are important butter producing countries. In this connection, some figures available for Germany in 1942-43 are interesting. In

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1918, only 63 gms. (about  $2\frac{1}{4}$  ozs) were available, per-head, per week, whereas in 1942-43 nearly 580. gms, that is  $1\frac{1}{4}$  lbs of butter were distributed per head per week.

## BUTTONS

Two big firms from Lahore, Janda Mfg. Co. and International Mfg. Co. are making, during war days 150,000 gross buttons at the rate of Re. 1 per gross. In Dacca, there are a number of small factories making shell buttons from mother-of-pearl.

## CALCIUM CHLORIDE (see Heavy Chemicals)

Before the war, India imported annually only about 400 tons of Calcium Chloride. The Khara-Ghoda Salt works in Kathiawar produce nearly 1,000 tons, a year as a bye product from sea water. In this article, India can not only be self-sufficient but can also export to the neighbouring markets. It should be noted that calcium chloride is a bye product in many big industries.

## CAMPHOR

Natural camphor is a monopoly of Japan and has been produced in the island of Formosa. But like the indigo monopoly of India which has been broken by the manufacture of synthetic indigo, synthetic camphor from Germany has displaced natural camphor from Japan. It is worth our while in India taking up the plantation of camphor trees because India has several soils suited for this, as in Formosa. In 1939-40, India imported 1.7 million lbs. of camphor worth 29.3 lakhs

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of rupees and in 1941-42, the imports were only 7,00,000 lbs., worth rupees 14.7 lakhs. It should be noted that camphor is an absolute necessity for the manufacture of celluloid. At present, camphor is used only as an incense for burning before Gods.

## CALCIUM CARBIDE

Calcium Carbide is not yet manufactured in India. Imports of this article in India in normal times amount to 3,000 tons. The import price per ton (from Japan) was Rs. 186 per ton. One factory is being started in Rampur.

## CAPITAL

The total capital invested in India in industries is estimated at 700 crores of rupees for a population of 38.8 crores. The average investment per head in India comes to eighteen rupees. Out of the total of 700 crores, roughly 600 crores is said to be Indian capital and the remaining is foreign capital, mostly British. Compare with this the figures for United Kingdom and the United States for their industries. The capital invested in the U. S. A. before the war is estimated at 25,000 crores of rupees, for a population of 13 crores, and that of United Kingdom is 7,000 crores for a population of 4.5 crores. Therefore, the average investment per head comes to Rs. 18 per head in India, Rs. 1,500/- per head in United Kingdom and Rs. 2,000/- per head in U. S. A.

## CASEIN (Milk.)

About 1,120 tons of casein are in use mainly in the plywood industry. Casein is also used in the manufacture of washable distempers and as a sizing material

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in paper industry. The use of other proteins not derived from milk but from soya beans etc. are being used as a substitute for milk casein which is not very cheap. Milk casein is being produced in Aligarh, Agra, Anand, Broach, Bangalore and Nadiad (Kathiawar). Casein is also used for making artificial ivory and buttons.

## CATTLE AND LIVESTOCK (1940-41) (in Millions).

	Bulls and bullocks	Male buffaloes	Cows.	Cow buffaloes.	Sheep	Goats.
British India	47 millions	5.0 millions	36.5 mill.	14.1 mill.	28.5 mill.	39.3 mill.
Indian States	17 millions	1.4 millions	16.0 mill.	6.8 mill.	20.5 mill	20.1 mill.
Total ...	64 millions	6.4 millions	52.5 mill.	20.9 mill.	49.0 mill.	59.4 mill.

It is not known exactly how many of these have outlived the slaughtering campaign during the last 4 years to supply fresh meat to the fighting forces, in India.

## CEMENT (Portland)

During the war days, cement production in India has been on the increase. This industry has been well organised and is known as the Associated Cement Combine of India (A. C. C.). This combine controls the price, production and distribution of cement in the different provinces of India. The railway policy in India has not been very helpful in promoting the distribution of cement in India. After all, the railways in fixing the rates of transport of cement should bear in mind the cost of the cement itself. For some years, Japan had been dumping its cement in Bombay, Calcutta and Madras harbours at very low rates and had been charging 8/-Yen (Rs. 6-0-0) only per ton as

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freight charges for a distance of over 5,000 miles between Kobe and Bombay. During the war days, 80% of our cement production went for war purposes, for constructing aerodromes etc., and only 20% was supplied to meet the civil demands. In 1943, the production of cement went up to 2,050,000 tons. The capacity of Indian production is about 200,000 tons, a month. As the demand for cement is greater than the supply at present, arrangements are being made to import 50,000 tons a month from outside! India is rich in its supply of clay, limestone gypsum, required for cement industry and these are available in many places merely for the cost of digging hill sides. Why not put in some new cement furnaces in India instead of importing cement? It is interesting to note that before the war, for want of market and because of the high rates of railway transport, nearly 40 % of the productive capacity Indian cement factories was lying idle and the combine managed to make a profit all the same.

### CEMENT (asbestos)

Asbestos cement is a mixture of 15% asbestos fibres and 85% cement and is used for making tiles and flat corrugated sheets for building purposes. In 1937-38, India imported asbestos cement to the extent of about 3300 tons. The Asbestos Cement Co., Kaymore C.P. owns three factories, one at Kaymore and two in Bombay. Their total production is about 6500 tons of which 75% is taken up by Government departments. Asbestos is imported from Africa, Cyprus and Canada. India has large deposits of asbestos and these must be tested, and used.

### CEREALS

(See Millets) Jawar, Bajra, maize and pulses form the poor man's food in many provinces of India. In Mysore state, Ragi is also an important cereal and is a nourishing food for the poor man.

## CITIES IN INDIA

India is a big country with 7 lakhs of villages and the number of cities in India with a population of 1 lakh and more, twenty years ago, was thirty five. During the last twenty years, this number has increased from 35 to 58 and the aggregate population of these cities has increased from about 90 lakhs to about 1 crore and 65 lakhs.

## CLOTH PRODUCTION (see Textiles )

Cloth production in India is estimated at 6800 millions yards annually and of this 1200 million yards is used by the defence forces and the remainder goes for civilian use. Before the war, the average cloth consumption was 16 to 18 yds, per head per year and at present it is estimated that only 12 yds. per head per year are available.

## CLOTHING OUT-PUT

There was only one Government factory in India before the war at Shahajahanpur, for clothing manufacture, mostly for the army. During the war days, the demand for such clothing increased and orders were given to contractors. Over 120 million articles were thus produced by private distribution of work on a cottage industry basis and the production was 100 to 120 times the out-put of the one Government factory mentioned above. This method of work proved very beneficial by distributing the work over a large number of cottage workers.

## COAL

Coal is one of the most important raw materials required for the industrialisation of a country. England's

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greatness is due to its stock of coal and iron. In India, our coal industry is badly in need of rationalising and a careful state control. There is a huge amount of waste which can be usefully spared.

Over two lakhs of labourers are employed in the coal industry. In 1938, the total coal production was, in all, 28.3 million tons of which British India produced 25.3 million tons and Indian States contributed 3.0 million tons. The average coal production in India is about 25 million tons; out of this, hard coke of the order of 1,800,000 tons is produced and soft coke accounts for 900,000 tons. The production of coal-tar is estimated at only 100,000 tons. Coal production in Europe including Germany in 1942 was 404 million tons whereas before the war, Germany, alone produced only 182 million tons. India ranks eighth in the world in coal production.

The use of coal in pre-war days in different industries and departments is accounted for as follows  
(a) Railways—nearly 8 million tons. (b) Iron and Steel, 6 million tons. (this must have gone up during the war days!) (c) Cotton mills 1.7 million tons, (d) bricks and tiles 0.9 million tons (e) jute mills 0.8 million tons (f) other industries including domestic purposes 3.6 million tons.

The production of coal in Japan for a population of 98 millions was 38 million tons; in U. K. for a population of 48 millions, it was 32 millions and in India for a population of 38 millions, it was about 25 million tons (before war). The average works up to U. K. : Japan : India, as 160 : 96 : 15 or roughly 10 : 6 : 1 per head. This means India uses per head, per year 1/6th as much coal as in Japan and 1/10 of what is used in U. K. This shows our industrial backwardness.

## COAL-TAR PRODUCTS

The preparedness of a country for peace and war purposes depends upon its production of coal-tar products and its derivatives. These include the most fragrant of perfumes, the most varied of dye-stuffs and the most dangerous of explosives. India's place in this key industry is miserably low.

The coal-tar distillation in India is done by three companies, (1) Bararee Coke Co. (2) Bengal Chemical and Pharmaceutical works and (3) Shalimar tar products. The total coal-tar produced is estimated over 100,000 tons. The total distillation products are estimated to be as follows:—(a) light creosote oil 120,000 gallons (b) heavy creosote oil 450,000 gallons and (c) naphthalene 1,000 tons. The total is insignificantly small.

## COFFEE

The production and distribution of coffee, like tea, is being encouraged by a regular organization by establishing regular coffee houses in different parts of India to make people coffee-minded just as people are being made tea-minded, war-minded, air minded etc! Indian coffee compares favourably with Mocca, Guatemala and other coffees of the world. The production of coffee in India is as follows;

	1920-21	40-41
Area in acres	57,000	85,000 (acres)
Total yield in lbs	12,140,000	15,320,000 lbs
Yield per acre	213 lbs.	180 lbs. (?)

## CONSUMPTION OF FOOD-STUFFS (average)

The various provinces in India have got different tastes and naturally, the nature of food varies from

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province to province. The Madrasi prospers on rice and *rassam* and the Punjabi uses these only in a convalescent condition; the Bengali feels helpless without fish as helpless as fish out of water; the use of chilies is a necessity in the south, whereas in the north, the very sight of it is avoided, therefore, the averages of the daily consumption of food materials must be intelligently interpreted. The following figures have been computed for the whole population of India for the supplies available in India.

Ghee pure 6 to 9 ozs.	per head, <i>per year</i> .
Ghee (Vegetable) 6 ozs.	per head <i>per year</i> .
Rice 8 ozs.	per head per day.
Salt a little less than $\frac{1}{2}$ oz.	per head per day.
Wheat 3 ozs.	per head per day.
Sugar $\frac{1}{4}$ oz.	per head per day.
Milk 2 ozs.	per head per day.
Vegetables 3 ozs.	per head per day.

(Cloth—1 yard per head per month; paper 10 ozs. per head *per year*; soap 8 ozs per head *per year*!)

## COPPER

The world production of copper is estimated to be 2 million tons. India's share in this is only about 7,000 tons. Indian requirements of copper are estimated at a minimum of 30,000 tons. The production of copper ore and matte was 18,600 tons in 1937 and only 14400 tons in 1938.

## COTTON & COTTON PIECE GOODS Cotton

The production of cotton in normal years is as follows: (One bale of cotton weighs 400 lbs.) The total production of cotton is estimated to be 70 lakhs of bales of which 35 lakhs of bales (50% of the pro-

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duction) are normally exported. The value of these exports is Rs. 31 crores. In 1940-41, the figures for cotton production are as follows.

	Acres	Bales	Average yield per acre.
British India....	14,000,000 acres,	4,000,000	113 lbs.
Indian States....	9,300,000 acres.	2,000,000	84 lbs.

## COTTON PIECE GOODS

In 1939-40, the number of mills in India was in all 420 of which 355 are established in British India and 65 are located in Indian States. The number of spindles has increased during war from 6.2 millions to 8.4 millions and the number of looms has gone up from 109,000 to 168,000 in British India and in Indian States, the number of looms was 29,000 and spindles was 1.3 million. The total production of cotton piece goods in 1940-41 was 593 crores of yards and the export of cotton piece goods was 390 millions of yards in 1940-41. The Indian population is starving from cloth famine and the country is becoming literally a land of "Fakirs".

## COTTON TEXTILES

Before the war, the annual average production, was 3,800 million yards.

During the war, 4,800 million yards were produced.

Add to this the production of hand-loom production and subtract the exports from the country and supplies to the defence requirements, yet in 1943-44, 5868 million yards were available as against the pre-war average of 6260 million yards, a reduction of only 6% from peace supplies. Why then this scarcity of cloth in 1944 & 1945 ? Is the cloth lying in the mill godowns awaiting permits for selling in the market ?

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CROPS.—(and acreage under cultivation).

The net area under crops for 1939-40 is given as follows.—

	Area 1939-40	Yield for 1939-40	Yield for 1943-44.
Rice acres ...	70.1 Million	24.6 Mill. tons	28.0 Million tons
Wheat acres ...	30.0	9.0 "	10.0 Million
Jowar ...	21.7	4.5 "	
Gram ...	11.7	3.1 "	17.5 Million
Bajra ...	13.4	2.1 "	
Barley ...	6.1	2.0 "	2.0
Maize ...	5.8	2.2 "	1.5
Ragi ...	3.4	...	
Other grains & pulses.	28.8	...	7 to 9 Million tons

In 1931-32, India had a record crop. It was 33 million tons on an area of 81.3 million acres.

According to another authority the estimates are as follows.

Area under cultivation (1943-44.)

Crops (food grains including pulses)	186.8	Million Acres
Fibres (mainly cotton and jute)	18.9	" "
Oil Seeds ...	17.0	" "
Fruits and Vegetables ...	3.8	" "
Sugar Cane ...	3.8	" "
Drugs and narcotics (tea, coffee, opium, tobacco, etc.) ...	2.4	" "
Condiments and Spices ...	1.4	" "
Miscellaneous ...	2.5	" "
Total ...	247.0	Million Acres

"The combined average for basic food grains, in vegetarian India, rice and wheat is almost constant, 108-109 million acres from 1937-38 to 1942-43. The population has increased from 311 millions in 1910-11 to 388 millions 1940-41 with a corresponding increase in the corresponding rice-eating population. The main food

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grains production of India has remained constant between 50 and 51 million tons. There is a big lag between production and population figures.

If the average adult diet is only 1 lb. a day of food grains, the consumption needs of India are 50.5 million tons and with 4.5 million tons as seed requirements, the total food grains are, at least, 55 million tons. If half the population of India consume a little more a day *i.e.*,  $1\frac{1}{4}$  lbs. per day, the figures go up to 61 million tons and the normal production of the principal food grains is only 50 to 51 million tons. If the growers choose to keep any quantity as insurance against a bad harvest, if they eat a little more than the *poor* meal of past years, if there is any carry-over, it means a serious problem in the supplies available in the existing conditions of things for the un-agricultural population. All this difficulty is only for the requisites required for "mere existing." Other food stuffs like milk, ghee, fruit, vegetables etc. which are necessary for growth of the body and longevity of life are getting so scarce in their supplies that no proof is required to show that growth and long life are in grave danger!

## CUTLERY

The centres of production for cutlery are Aligarh, Moradabad, Nizamabad, Wazirabad, Calcutta, Bombay and Lahore. In 1943, the demand for cutlery went up to nearly 6 million pieces valued at Rs. 96 lakhs. Tatas have been able to manufacture a suitable kind of steel for this industry. Sialkot has been able to manufacture with Government help and guidance (in war days!) 30,000 surgical instruments of the first quality and Bombay also has been able to produce for years fine quality surgical instruments.

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There are no technical schools properly equipped for teaching cutlery and surgical goods as manufactured in Sheffield in England or Solingen in Germany. With a little guidance, this industry can easily be established as a cottage industry provided the right kind of steel is manufactured in India, which Tatas are said to be making now at Jamshedpur, and if cheap electricity is available.

## CYCLE INDUSTRY

There are only two cycle manufacturing indigenous concerns in India, Hind cycles Bombay, and Hindustan Bicycle Manufacturing Corporation Ltd., Patna. In 1942, the Hind Cycles manufactured 17,641 cycles and the Hindustan Cycle Mfg. Co. produced 4100 cycles. The estimated output of the Bombay concern is expected to reach the figure of 25000 and the Patna concern is expected to produce 15,000. It is feared that there has been already a strangling in the supply of the right kind of steel from Govt. control to (Birlas' Bombay Concern) which would seriously affect even this small out-put. India needs annually 3 lakhs of bicycles. India's output with these two concerns is expected to reach a production of 1 lakh of cycles provided no obstacles are put in their way. Pre-war, a Japanese cycle used to cost only Rs. 15 to Rs. 20 and an English cycle used to cost Rs. 40. At Sakai, near Osaka, in Japan where this industry flourished, both coal gas and electricity were made available at cheap rates and different parts of the bicycle were made in small and humble cottages, of a size nearly 20 ft. by 30 ft. and these were then assembled for the different world markets. England has already planned the manufacture of 6 million (60 lakhs,) cycles within the next five years. A new light and durable alloy, instead of heavy steel, is to be used for its manu-

facture. Indian manufactures should immediately arrange to import this new alloy or else the Indian market will be swarmed and submerged with the improted cycle.

## DIETS (DIETETICS) (see Energy value)

The science of dietetics and the problem of diets in India are both of national importance. India is a big country rich in varying climates and extremes of temperature. Jacobabad in India has the highest known temperature in summer and Cherapunji has the greatest of rain falls known to the world. Beginning with the snow clad Himalayas where low temperatures prevail, down in the south in Madras comparatively very hot climates prevail. The amount of food required in the hot plains of Madras, in the temperate climates of the Deccan plateau, in the marshes of Bengal, in the enervating plains of U. P. and Bihar, in the colder climates of the Himalayas and Kashmir, and in the hot plains of Rajputana and Sind must vary in quantity and in quality according to the climatic conditions. Proper data must be collected on the "basal metabolism" involved and the foot pounds of work done in the different parts of India. There are hardly two or three institutions in the whole length and breadth of India where the required amount of scientific work is being done. Like most other vital subjects, this one also is in a chaotic state; added to this, famines and scarcity caused by war conditions are disturbing the national equilibrium. Even the starving condition of the population has got to be scientifically and statistically proved!

The first important point that has got to be established is the quantity of Calories required per average Indian. Robert McCarrison has put down

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in his famous book over 3000 calories as being India's minimum. This is obviously an over estimate as it is based on and copied from the European data which are absolutely inapplicable to Indian conditions. Dr. Aykroyd, India's nutrition expert, has put down nearly 2600 calories as being the average for the Indian adult. Dr. N. N. Godbole (the author of this publication) in his book on "Milk, the most perfect food" has fully discussed all the aspects of this question. Further, from the experiences gathered in food research institutes in India and in other Asiatic countries specially Japan, he has calculated on biological and other scientific grounds that an average of 2200 calories per day is a very safe estimate for tropical Indian conditions. In cases of extreme changes in the climatic conditions, the average must of course be altered and modified. Assuming that the food intake is to be in the ratio of carbohydrates 5·5 : fat 1 : protein 1, the following quantities of food stuffs are given to suit our Indian conditions. It must be borne in mind there will be 'small differences to suit the needs of the vegetarian and the non-vegetarian in India.

Me. Garrison

Dr. Aykroyd.

Godbole

Proteins 90-100 grms:	78 gms ; 292 Cal.	65 gms ; 260 Cal.
	400 Cal.	74 gms ; 666 Cal.
Fats 80-90 grms—	408 gms ; 1682 Cal.	60 gms ; 540 Cal.
	810 Cal.	300 gms ; 1200 C.
Carbohydrats 300,450 grms.	Total 2590 C.	Total 2000 C.
	1800 Cal.	For India, two meals a day, each meal
		to be made up of ;
Total ...	8010 C	4 ozs. Ata flour
Japan has three meals a day and each meal is made up of—	2 ozs. Rice	
Rice 150 gms:	8 ozs. Milk	
Fat 10 "	1 oz. Oil and Ghee	1100 Cal. per
Proeins 30 "	8 oz. Veg e t a b l e	meal.
	Cal $\frac{1}{2}$ oz. Dal	
	per meal	

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	400 Cal.	74 gms ; 666 Cal.
Fats 80-90 grms—	408 gms ; 1632 Cal.	60 gms ; 540 Cal.
	300 gms ; 1200 C.	810 Cal.
Carbohydrates 300,450 grms.	Total 1800 Cal.	Total 2590 C.
	For India, two meals a day, each meal	2000 C.
	to be made up of ;	
Total ...	3010 C	4 ozs. Ata flour
Japan has three meals a day and each meal is made up of—	2 ozs. Rice	
	8 ozs. Milk	
	1 oz. Oil and Ghee	1100 Cal. per
Rice 150 gms :	800	meal.
Fat 10 "	8 oz. Vegetable	
Proteins 30 "	½ oz. Dal	
	per meal	

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## DISTILLERIES (See Alcohol)

The total number of distilleries in India is about 15 and their daily production capacity is estimated at 21,000 gallons. There are four concerns manufacturing absolute alcohol miscible with petrol and the daily production of three of these *viz.* Meerut, Mandya and Hyderabad have a capacity of 6,000 gallons per day. The total amount of alcohol used for defence purposes in 1943 amounted to 3.5 million gallons. The average monthly production of all the distilleries is estimated as follows—

- (i) British India ... 7,18,000 L.P. Gallons
- (ii) Indian States .... 66,000 do.

making a total of per month 7,84 000 gallons,

U. P. distilleries alone are producing one lakh gallons of rectified spirit per month. Of this, 60,000 gallons a month are being consumed by motor transport in this province. The majority of these services have taken to these 'ersatz' fuel and its use is being encouraged in private cars.

## EDUCATION (Literacy)

"Upon the education of the people of this country (Great Britain) the fate of this country depends."

The expenditure incurred annually on recognised educational institutions in India was about 16 crores of rupees and by 1940-41, it went up to 30 crores of rupees half of which *i.e.* nearly 15 crores of rupees was met by the Government and the other half was met out of private and municipal corporations. The increase it must be noted is after a period of 20 years. In the meantime the increase in the population between 1921 to 1941 is about 10 crores!

The number of students receiving primary education in 1920-21 was 6 millions and in 1940-41, it

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was 12 millions. The number of Students receiving secondary education was about 1 million between 1920-21 and by 1940-41, it rose to nearly 3 millions. The total number of students in Indian Universities was 46000. The total number of the so-called vocational technical and industrial schools (where elementary types of 'mistris' are produced) was in 1920-21, 10,000 and in 1940-41, it rose to 39,000 schools. The number of Arts and Science Colleges in India in 1940-41 was 127,000 and Professional Colleges were 26,000. The most important and interesting item is the expenditure incurred per head, on education. Before the war, Great Britain was spending from the public funds the equivalent of Rs. 33/2/- per head of the population whereas in India, in 1938-39, the expenditure on education was Rs. 0-8-9 per head. No wonder, literacy is where it is today.

## EGGS

The annual production of eggs is estimated at about 3100 million eggs. The Indian eggs are smaller in size than English or Danish eggs. Eggs are in a way a wasteful food, because in the conversion of food grains to eggs via. the medium of hens, the loss of calories involved is about 93%. The great danger associated with the use of eggs as food material in India is that there is no state control in the sale or examination of eggs before they are put in the market. In European countries, due to the cold climates eggs preserve longer, in India there is neither the cold climate nor the state control.

## ELECTRICAL POWER

The total electrical energy produced and sold in 1943-44 was 2896 million units in India. In 1938-39 it was 1618 million units. Nearly 66% of this is used for industrial purposes and 12% is used by electrical

railways. The average current production in India is 7 units per head, per year out of which 4 units are hydro-electric and 3 units are derived from other sources, coal and oil. The same average in U. S. S. R. is 200 units per head, per year, Great Britain 500 units per head per year and U. S. A. is about 890 units, and in Norway even in 1929 it was 2250 units per head per year.

The cost of production of electricity per unit, minimum is  $\frac{1}{2}$  pie ( $1/24$  of an Anna) in nearly 1 pice (or  $1/4$  of an Anna). It is distressing to find that with in a radius of twelve miles of our hydro-electric power productions, the rate of supply per unit is as much as As. -/4/- (e.g. Roorkee, Lonavala).

### ENAMELING (ON METAL)

Although metal enamelling factories were started in India, long ago, an appreciable production began in 1922. There are in all 12 big factories in India, 2 in Bengal, 5 in Bombay, 1 in Madras, 1 in Baroda, 3 in Punjab and 1 in Delhi. The two largest are the Sur Enamel Works, Calcutta and the Bengal Enamel Works, Palta.

### ENERGY VALUES OF CERTAIN FOOD STUFFS

(in big (calories) (see Diets).

1 gm. Fat	....	...	9.3	Cal
1 gm. Protein	...	...	4.1	„
1 gm. Carbohydrate	....	...	4.1	„
1 oz. Milk (cow)	...	...	18	„
1 oz. Milk (buffalo)	...	...	33	„
1 oz. Mutton	...	...	42	„
1 oz. Rice	...	...	100	„
1 oz. beef	...	...	32	„
1 oz. atta	...	...	102	„

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1 oz. Vegetable oil	...	...	150	"
1 oz. Ghee	...	...	208	"
1 oz. Dal	....	...	100	"
1 oz. Bengali, Gram	....	—	100	"
1 oz. Soya beans	—	....	123	"
1 oz. Potato	—	....	28	"
1 oz. Ground nut (ordinary roasted)			150	"
1 oz. dried coconut	....	...	126	"

### EXCISE DUTY (INCOME)

The income from central excise duties in 1942-43 was 30 crores of rupees. In 1921-22, the ratio of the excise revenue to customs duty was hardly one in eleven whereas it has increased to one-half in 1942-43.

### FERTILIZERS

(See super phosphates and am-Sulphate. There are three classes of fertilizers in use all over the world for agricultural improvement, (a) Potassium salts which are useful for synthesising and building up of plants and the vegetable kingdom (just as sodium chloride or common salt is useful for the animal kingdom) nitrogen salts in the form of different compounds like ammonium sulphate and combined phosphorus in the form of super phosphates. The last of these are badly deficient in the Indian soils. Re-ammonium Sulphate, the quantity given to the soil is disgracefully small and so also the superphosphate supply is miserably small. In fact, India is using only 0.6 lbs. of fertilizers per acre. Even the supplies of green manures and composts are inadequately small, of even a comparatively poor country like Egypt is using about 230 lbs. fertilizers per acre. The result is India is producing about 820 lbs. of rice per acre. and the supply has remained steady for years. It can be safely said that the top layer of 8 to 12 inches

of the Indian soil has lost practically all its available fertility by the systematic drain imposed on it during the last one hundred years! Egypt is producing nearly 3000 lbs. of rice per acre whereas in Japan the yield is said to be about 4000 lbs. per acre. Poor or no manuring, poor or little yield is a law of nature.

India is exporting bones worth about Rs. 32 lakhs annually. This export should be prohibited! Fish manures worth Rs. 4 lakhs and oil cakes worth about Rs. 30 lakhs are also exported from a poor country, as though we had a surplus of manures in India! Both these are useful as manures when they are used as mixed manures. The Indian soils must be immediately examined and suitable admixtures of manures should be prescribed and administered to different provincial soils if the people of the country have to live and flourish and not die like flies. India needs millions of tons of fertilizers and plans are being made only for a three or four lakhs!

In 1937, U. S. S. R. (Russia) had used  $1\frac{1}{2}$  million tons of superphosphates whereas in 1917, it was only a few thousands of tons. One ton of nitrogen is contained in or is the equivalent of five tons of ammonium sulphate. The following figures of the use of ammonium sulphate would be staggering to the poor Indian mind!

#### PRE-WAR FIGURES

Nitrogen 1 ton—5 tons Ammonium sulphate.  
(used per annum)

	Nitrogen	Am-sulphate,
U. S. A.	350,000 tons	1,750,000 tons,
Japan	400,000 ,,	2,000,000 ,,
Germany	250,000 ,,	1,250,000 ,,
France	234,000 ,,	1,170,000 ,,
Korea	150,000 ,,	750,000 ,,
U. S. S. R.	200,000 ,,	1,000,000 ,,
Italy	120,000 ,,	600,000 ,,

The export of food grains is deplorable in a country that does not give back to the soil the fertility it takes from the soil. In countries where fertilizers are used, the export of food grains is a business proposition and the export is justified. In the case of India, the export of food grains, bones, hides and skins etc., is a criminal waste because it means in other words selling away the working capital—the fertility—of the soil.

In the matter of the production of sulphuric acid in India out of the total 73,500 tons of the acid produced in India only 19720 tons has been used for the two fertilizers—super phosphates and ammonium sulphate. Of these fertilizers, again, it should be noted that a major portion has gone for the rich crops like sugar, tea, coffee, etc. This means that the staple and staple crops, the backbone of the poorer masses have got very little as their share.

### FISH

According to one authority on foods in India, the annual production of fish (sea fish) is estimated to be 6,60,000 tons. No average inference can be drawn from this figure, because a large percentage of the population of India does not even care to touch it on religious and other grounds. The one nation in the world which runs mad after fish is Japan and for this as given in the table on diets, per meal about 40 gms of fish (on a three meal a day theory) are used. In India, Bengal comes very near to Japan in the use of fish and rice.

### FOOD GRAINS (See Crops)

All the figures regarding food grains are given under the heading crops. The prewar area under food grains was 195 million acres whereas after the outbreak of the war, under the "grow more food" campaign, over 206.3 million acres have been put under crops. In 1943, the production of food grains is said to have

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reached about 61 million tons a year. Calculating on an average of 1 lb. of food grains per head, per day, and assuming the food grains are not exported and are equally distributed, there is a deficit of 10,000 tons per day.

## FOOTWEAR

In Cawnpore, in the prewar year, only 100,000 pairs of footwear were being made annually. In 1941, as a result of the sudden demand created by the war 3.6 million pairs were made and in 1943, the production went up to 6.6 million pairs. Messers Bata Shoe Co. a Czechoslovakian firm was making at Batanagar near Calcutta 19,000 pairs per day and now their production is said to be doubled. The rubber footwear before the war was supposed to be about 12 million pairs annually. This is now practically stopped because the supply of para rubber came under Government control as the supply of rubber was cut off owing to Japanese conquest of Malaya.

## FORESTS

The following table is of great value.

	1920-21	1939-40
Area under forests in acres	66,377,000	68,112,000
British India :—		acres

Proportion of forest area	13%	13%
to whole area		

	1920-21	1938-39
Indian States.		
acres	17,600,000	19,123,000

Proportion of forest	13%	13%
area to whole area.		

The main question of the efficiency of the forest policy in India is (a) whether the forests destroyed in India are being replaced—afforested—and if so in what proportion? and (b) whether the forest department is conversant with forest industries and if so what is being done

to regenerate and replace the forests to help the commercial forest products and forest industries ! The replies to both of these questions are neither satisfactory nor encouraging.

### FORMALDEHYDE (Formalin)

The demand for formaldehyde in India is not very great, so far. Pathological laboratories use about 60 tons annually ; another 50 tons are required for fixing the glue used as a cementing material in the plywood industry. In 1929-32, Kirloskarwadi had put a small plant for making formaldehyde from methyl-alcohol imported from Bhadravati iron works in Mysore State, South India. The cost of transport of the methyl alcohol was heavy, thanks to the railway policy in India ! This formaldehyde was supplied for some time to the German concern in Bombay Messrs Havero Trading Co. in glass carboys and it was supplied all over India—in the name of the German concern and as a German product. Further we are told that “the levy of an excise duty on methyl alcohol by the Bombay Government killed this industry in its infancy.” The Mysore Government has purchased this unit from Kirloskarwadi and has duplicated it. They are said to be making 60 tons of formaldehyde per year. Attempts made at the Bangalore Institute of Science in Bangalore to produce formaldehyde have not been successful. Formaldehyde is a necessary raw material in the manufacture of bakelite. The production of formaldehyde is not taken up because it is not largely in demand at present and bakelite manufacture cannot be taken up because no formaldehyde is available. India is using a large amount of wood and charcoal as fuel. While using these we are wasting a large amount of methyl alcohol which is let off into the air as a bye-product a waste only equal and parallel to the coal distillation

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products in the manufacture of coke by the open burning method. Per 128 cu. ft. of hard wood distilled nearly 10 gallons of methyl alcohol are available and this means almost an equal quantity of formaldehyde.

## GHEE

The total milk production is estimated to be 22,000,000 tons. Of this milk 13,000,000 tons are converted into ghee. Official figures are based on a 6% (?) average fat (ghee) content of milk in India. This seems to be a little too high with milk of our poor breeds of cattle. This gives an amount of 15,900,000 cwt. of ghee (or 1,741,160,000 lbs. of total ghee) for a population of 380,000,000. The average therefore comes to 4.6 lbs. per head per year or 1/5 oz. per head per day or  $\frac{1}{2}$  tola per head per day!!!

The amount of milk left over for Dahi, Khowa and for drinking purposes is therefore only (22 million less 13 million) 9 million tons. This gives an average of 53 lbs. per head per year only or  $4\frac{1}{2}$  tolas per head per day (5.3 gallons per year).

## GHEE (Vegetable or Vanaspati)

Vegetable ghee is available in India at present at the rate of 300 tons per day or nearly 100,000 tons per year. Out of this 300 tons only one factory in India is producing about half of this per day. The other units are producing from 5 tons to 30 tons per day and are distributed all over India. Plans are being made increase a production of this by about 200,000 tons more in the near future.

The one advantage which vegetable ghee or "Vanaspati" possesses is that it *looks* like ghee and is given the aroma of ghee. Its chemical composition is quite different from that of pure ghee and its food value and

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assimilability and digestibility are of a doubtful nature. Like tallow, and lard, it is rich in stearic acid and what is more it contains a new constituent iso-oleic acid which is not possessed by any natural oil or fat. The chemical composition of the human fat is such that it can be built up easily, from, natural oils and butter fat but not from vegetable ghee whose constituents are a sort of ballast to the human system and must be passing un-used after upsetting the digestive system. This problem is of great national importance and our hygienists must examine this question fully. In the case of tallow, it has been shown by experiments in Europe that a good deal of the tallow passes unused and is recovered from drains!

## GLASS.

In 1938-39, the total number of glass factories in India was 101, the U. P. leading with 38 factories. Before the war, the production of glass sheets and glassware was worth about 2 crores of rupees, the imports in the same year about 1.2 crores worth of rupees. Indian production in 1914 met only 25% of the demand where as today it is meeting over 80% of the Indian demand. Firozabad is leading in the manufacture of glass bangles and has employed nearly, 40,000 workers. Sheet glass production in India has gone up to 5500 tons manufactured in only two glass factories the first of their kind in the East. In 1937-38, India even exported glass worth about Rs. 1.3 lakhs to Burma and Ceylon. Soda ash as used at present is imported and only a small amount is made at Dhrangadhra. The I. C. I. and the Tatas are also expected to put on the market Indian made soda ash. With Indian soda ash, and cheap coal, India can not only supply her own needs but can also easily export to the neighbouring markets. India in using

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a little over 10,000 tons of soda ash for the glass industry. Over 70,000 tons of glass are being made in India. Neutral glass and high melting glass useful for chemical ware are also being made in India during the last few years and experiments are being carried on for the manufacture of lenses and for high class scientific apparatus. On the population basis, the production of glass per head per year is only worth Rs. 3/- In Japan for a population of 8 crores, glass worth Rs. 8 crores is produced.

In the years 1943-44 and 1944-45 nearly 5000 to 6000 tons of glass are being manufactured per month. The total quantity of glass bangles manufactured in India is of the order of 7000 to 9000 tons per year and the total value is 1.5 crores of rupees. For the years 1943-44 and 1944-45, India has produced glass worth about Rs. 4/- crores.

### GLUE AND GELATINE.

The imports of glue and gelatine in 1937-38 were as follows :—

1937-38

	Tons	Value in
Glue .....	.... 1000	Rs. 4,70,000
Gelatine ...	... 30	37,000

The price of glue is Rs. 470/- per ton exclusive of import duty which is 25% i.e. about Rs. 600/- per ton. inclusive. The average price of gelatine per ton is Rs. 1600 inclusive of duty. There are a few factories in Agra, Madras, Calcutta, Cawnpore, Lahore and Delhi, but mostly the commercial quality of glue is being manufactured. The match industry is using at present mostly Indian made glue.

## GLYCERINE

The recovery of glycerine in India is a modern industry and has been taken up during the last ten years. Most of the spent lyes from the soap industry were thrown away into the city drains ! These plants are now established in Bombay, Calcutta, Bangalore and Tatapuram. There are four factories in Bombay alone ; in other places there is one factory each. The total production is estimated at 150 tons. This seems to be sufficient for India for the present. Nearly 800 tons of glycerine are taken up by the cordite factory at Arvankadu. At one time, recently, some glycerine was even exported from India to South Africa ! Most of the small factories at Calcutta are throwing away their glycerine water, from the spent lyes, into the drains. If this is collected in a central factory, as is done in many soap centres, in one Calcutta, alone, it would be possible to recover nearly 300 tons a year, as a bye product.

## GOLD

In India, the production of gold has shown the greatest amount of decrease in production, of all the metals inspite of the great rise in price. Kolar gold fields, in Mysore State are the biggest producers of this metal in India. The mines are worked at a depth of 8000 ft. below ground level, (about 5000 ft. below sea level.)

Gold production in India (Indian States) was in 1925, 394,000 ozs and in 1938, only 322,000 ozs.

## GRINDERY

(Subsidiary industry to footwear)

This industry did not exist before the war. The manufacture of heels, toe-tips, eve lets, nails thread etc, was taken up soon after the war to assist to the boot and shoe industry.

## Production of heel and toe-tips

Prior to war	Production was nil
1941	... ... 6,920,000 pairs
1942	... ... 24,170,000 pairs
1943	... ... 28,114,000 pairs

No adequate machinery is available for making these parts and yet, so much has been done to help the war effort. The state aid is needed in such directions and a little education will be so helpful. It is idle to expect any progress with an in-different Government administration.

## GYPSUM

Before war, Indian production of gypsum is estimated at 70,000 tons only. This is mostly used as one of the materials in cement industry and to a small extent for the manufacture of Plaster of Paris. There is a very great field for the manufacture of high class Plaster of Paris as used by dentists. This is all imported. All that is required is a careful heating at certain definite temperatures.

Gypsum is largely used in the manufacture of Ammonium sulphate by what is known as the B.A.S.F. (Badische Anilin and Soda Fabrik) method which was perfected during the war of 1914-18 in Germany. The Government of India has on hand proposals, for manufacturing annually 350,000 tons of Ammonium Sulphate during the next few years. For this nearly 500,000 tons of gypsum (and 150,000 tons of coke) will be required annually.

## HANDKERCHIEFS

It is so very disgraceful to note that in spite of a prosperous textile industry, where the finest of cloth is being prepared cheap, handkerchiefs are imported (mostly from Japan)! It appears, that those concerned have scarcely paid any attention to this. In

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Japan, this is a cottage industry and our factories can also encourage this type of cotton industry round about the mills. In 1937, 93 lakhs of handkerchiefs worth about Rs. 11 lakhs were imported. The average price comes to about  $8\frac{1}{2}$  pieces per rupee.

### HEALTH (Public)

The following information regarding public health is sufficiently explanatory.

#### British India (excluding Burma)

	1921	1933	1939	1940
No of hospitals and dispensaries	3263	4869	5650	5885
No of patients treated	35,463,000	62,618,000	7,905,700	81,815,000
Mortality from cholera, small-pox and plague per mille	2.4	1.8	0.7	0.7
Total expenditure, Government and Municipal	1267 { Rs. lakhs }	1565 { lakhs }	1524 { lakhs }	not available, Rs.

From the above figures, it is clear, that for 29.5 crores of the population of British India in 1940-41, there were 5885 hospitals, the number of patients treated was nearly 82,000,000 (millions) and the total expenditure on the public health (Central and Provincial Governments, Municipalities and District and Local Boards together) was Rs. 15 crores and 24 lakhs of rupees.

This means, the expenditure per head (in 1940) on the health (*i.e.* money spent on the sick and the suffering) was nearly 9 As. per head per year—that is 3 pice ( $\frac{3}{4}$  anna) per month—per head. The number of hospitals was nearly 6,000, for 30 crores of population (British India !) that is to say one hospital for 50,000 of the population and the total number of patients treated was 82,000,000 for 30 crores of the population, for the whole year !

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### Birth rate and death rate (per 1,000).

	1921	1940
Crude birth rate	32	33
Crude death rate	31	22
Infant mortality per thousand live births	198	160

In the last 20 years, the birth rate has remained practically steady and the death rate has gone down from 31 to 22 (per thousand) and infant mortality has also gone down from 198 to 160.

## HEAVY CHEMICALS

The term heavy chemicals refers to those articles which are produced by the ton and which are only commercially pure. The term fine chemicals comprises articles such as medicines and pharmaceutical preparations which must be pure and therefore are produced on a small scale. The manufacture of heavy chemicals is an index of industrial development sulphuric acid is by far the most important of these because it is both a raw material and a finished product. India has remained backward inspite of a long and civilised rule because the policy has been one of exploitation. In the country no industrial training was given. The result was, Indian students had to go abroad and get for themselves such training as they could. It is this knowledge imported by Indian students that has been the basis of all industrial development. In the war period, Indians of their own initiative have developed a number of industries both chemical and mechanical by the impetus given by the necessity of war and even a helpless Government was compelled to aid and "help" these industries for the successful prosecution of the war as all foreign imports were cut off. In this "helping" also, the factories had to supply to Government at controlled rates known

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as the ceiling prices. The progress achieved by many of these industries during a brief period of four or five years indicates the capacity and the intellect of the Indian.

## ALUMS

Sulphuric acid is both a finished product and a raw material. As the railway transport is an expensive item, a number of factories six of them make their own sulphuric acid for their own use and not for any business. These are Assam Oil Company, for refining of petroleum Oil, Beraree Coke Company for their distillation of tar etc. Rohtas Industries, Dalmianagar for their products, Burayaur coal Co. of Calcutta, Atlas Fertilizers Ltd., Calcutta for their fertilizers & cordite, Aruvankadu and the Kirkee factories for their nitrates for ammunition. Other factories are making sulphuric acid for the important class of derivatives namely alums. The following are the important sulphates

### Alumina Ferric, and Pota h Alum

Since 1941, about 300 tons of Alum are used annually in the production of foam type fire extinguisher refills which have been produced for the first time in India. The production in India is about 7,000 tons and the imports from U. K. are about 6,000 tons. The present Indian requirements are as follows : Public health 3,600 tons : Paper sizing 8,400 tons : Textiles and miscellaneous 1,000 tons : Total 13,000 tons. In normal times, after the war about 20,000 tons of alum would be required. The main raw materials required are bauxite and coal. During the war, coal being under Government control, many industries have suffered because of war needs and the difficulties of transport. Bauxite could not be transported because of the railway transport difficulties and sulphuric acid also could not be moved.

The quantity of ferrous sulphate produced in India (largely as a bye-product at Jamshedpur tincoated sheets) was over 1000 tons and magnesium sulphate manufactured was about 4000 tons.

### BICHROMATES

The manufacture of bichromates, of sodium and potassium has been an extremely new and enterprising chapter in the history of heavy chemicals in India. There was practically no production of this heavy chemical in India before the war. The annual demand before the war was only about 1000 tons. The first gazetted notification giving production of this chemical was issued in the year 1941 and a sort of promise of helping and supporting this industry has been also made. There are two bichromates, one of sodium and the other of potassium. Of these sodium bichromate is hygroscopic whereas potassium bichromate is not and therefore in industries like the match industry only the potassium bichromate can be used. In India, at present, nearly 60 tons of this are used annually only by the match industry. Sodium bichromate is used in industries like that of chrome-tanning where solutions are used. At present there are 12 factories in India producing about 250 to 300 tons per month. India has yet to import about 250 tons per month. But for the difficulties of coal, transport etc., Indian production can go upto at least 400 tons per month. The cost of production in India is at present Rs. 85 to Rs. 100 per cwt, as against Rs. 80/- per cwt., the price of the imported article (from U. K.). In India, yields have not yet reached their theoretical maximum due to difficulties of the manufacturing technique fine grinding, proper mixing and right roasting which will of course, need some more time. The peace requirements of India are about 2000 tons annually. The wonder of it is, India has been able to produce so much in the short period of a few years, able on her own independent efforts.

(H) At present bichromates are being manufactured in the following concerns; Cawnpore Chemical Works, Cawnpore, Binlys at Madras (used for their khaki cloth), Bichromates Manufactures Association, Bombay, produces about 80-100 tons per month and small factories at Calcutta and Nagpur are meeting the local demands. The present production more than meets the peace demands. The question is how far the present production will be protected against foreign dumping after the war is over. India should try for the neighbouring markets of Burma, China, Afghanistan India etc. Already, foreign dumping has begun.

### Production Capacity.

Present Consumption.

(Annual).

Madras and Mysore	120 tons.	Textiles	4680 tons.
U. P.	.... 150 "	Tanning	600 "
Bombay	.... 110 "	Chromepigments	600 "
Calcutta	.... 20 "	Match Industry	60 "
Nagpur	.... 5 "	Chromic acid	50 "
Monthly Total	.... 405 tons.	Total Consumption	5990 tons.

Annual production 4860 tons.

### Caustic Soda

This is a very important chemical useful and necessary for the soap, textiles, paper and other industries. In 1943 the restricted supplies were about 25,000 tons: these were supplemented by the Alkali and Chemical corporation, (1500 tons) and Mettur Chemical & Industrial corporation, (2000 tons). The Tatas (Mithapur) at Oveha have just started production and the potential capacity is supposed to be 7500 tons per annum. There is one plant at Rishra

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in Bengal whose production is taken up by Titagarh and Bengal paper mills. Travancore is proposing to have a capacity of only 300 tons. The maximum Indian production will be about 15,000 tons and the total consumption in India is expected to be about 50,000 tons. There is still field for more production if it is not to be imported!

### **Chlorine & bleaching powder**

Chlorine and bleaching powder are both necessary for bleaching purposes. In the electrolysis of common salt wherever electricity is available cheap, both caustic soda and chlorine can be manufactured (with hydrogen gas as a bye-product). The production of caustic soda is naturally limited by the demand of chlorine and its derivatives if the process is to be used economically; for every ton of caustic soda produced, nearly 0.9 tons (9/10) of chlorine are produced, and 1 ton of chlorine gives about 3 tons of bleaching powder. The present demand for bleaching powder in India is as follows:—

Paper Mills require	5400 tons
Textiles and Surgical dressings	3600 tons
Public Health	18,00 tons
Chloroform and others	300 tons

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Total	11,100 tons
Present production by Mettur and Tatas is	4200 tons

Deficit     6900 tons

The capacity of Mettur is 2500 tons and that of Tatas is estimated at 4500 and Rohtas Industries has a capacity of 1250 tons making a total of 8250 tons. Rishra (Bengal) Government factory has a capacity of 3000 tons. The value of the bleaching powder is measured by its percentage of chlorine

(H) content. Liquid chlorine is used in preference to bleaching powder for water purification, paper and also for textiles. If India produce 50,000 tons of caustic soda, by the electrolysis method, there will be a simultaneous production of 44,000 tons of chlorine. Of this about 4-5000 tons of chlorine can meet the demand of 12-15000 tons of bleaching powder and there will be a surplus of 40,000 tons of chlorine. Therefore, caustic soda will have to be made by caustic-soda carbonate and lime where reprecipitated chalk will be a bye product.

Caustic Soda, Bleaching powder and  
Chlorine (Capacities) 1944-45).

Caustic Soda	Chlorine	Bleaching powder	Tons
Tons	Tons	Tons	Tons

Alka. Chem Corp. of India (I.C.I.), Rishra	1800	1600	...
Mettur Chem Ind. Corp., Madras	1800	300	2250
Tata Chemicals Ltd., Mithapur	6000	100	4000
Total cap.	2000 (Electro)		6250

### Potassium Chloride & Potassium Chlorate

Potassium Chloride is to be recovered as a byproduct from the manufacture of Potassium Nitrate which itself is available as an efflorescence on some of the Indian soils. With a little help and preliminary investigation, India can produce upto about 50,000 tons, annually.

## Potassium chlorate

The prewar consumption of Potassium chlorate was about 1500—1700 tons. The defence services require only about 20 tons a year. The imports into India in 1940-41 were 1200 tons; in 1941-42, 1000 tons and in 42-43, the import was 100 tons only. During the war days, the stock of Potassium chlorate in India was all under Government control. W. I. M. Co., of Bombay supported by the Government through its commerce department have started a factory producing 1500 tons per annum mainly for the match industry. Mettur chemical corporation have put up a plant producing 1 ton a day, i.e. 300 tons a year. Their present production is  $\frac{1}{2}$  a ton a day. The potassium chloride required is recovered as a bye-product from the potassium nitrate manufactured in India. The cost of production is said to be high and if this is not lowered, it will be difficult to stand the foreign competition. This is used in explosives and fire works.

## Potassium Nitrate

Up to the year 1860, India was the one source for this important article used in explosives and also as a manure. The Chilean saltpetre came next. In 1860, India exported 35,000 tons, and in 1914 only 13,000 tons. The synthetic manufacture of nitric acid from ammonia and the oxygen and nitrogen of the air have replaced the Indian nitrate. Further, the presence of iodine in the Chilean saltpetre has given it an additional advantage and importance and has made it indispensable for countries which have no source of iodine. In world war No. 1, (1917), the production of potassium nitrate was 30,000 tons. Before 1940, it was 11000 tons in production. During the last war, India once again became an exporter of 26,000 tons. This industry

must be helped and encouraged. During the last four years it is being used (by combustion with charcoal) for the manufacture of caustic potash. This has been a new development during this war.

### Soda Ash and Soda Bicarbonate Soda Ash

There are three big manufacturing concerns for this important article. Dhrangadhra Shakti Alkali works, at Dhrangadhra State in Kathiawar was the first concern to be started. For a long time it failed to work economically and it changed hands. It was sold away at a loss and now during the recent war it is working under a new management. This is being worked on the ammonia process. One of the great difficulties is said to be an adequate supply of coal. The I. C. I. factory at Khewra and Tata Chemicals at Mithapur are supposed to start full work soon. The present capacity is as follows :—

Dhrangadhra	...	18,000	tons	per annum
I. C. I. (Khewra)	...	20,000	tons	"
Tata Chemicals	...	18,000	ton	"
Total	...	56,000	tons	p. a.

The estimated consumption in India is about 80,000 tons distributed as follows.

Glass Industry	...	10,000	tons	(12.5%)
Paper Mills	...	10,000	tons	(12.5%)
Textiles	...	9,000	"	(11.25%)
Bichromates	...	5,000	"	(6.25%)
Sodi. silicate (waterglass)	...	3,000	"	(3.75%)
Ordnance factories	...	3,000	"	(3.75%)
Miscellaneous Chemical Industries	...	2,000	"	(2.5%)
Washing and Cleaning	...	38,000	"	(47.5%)
Total	...	80,000	tons	

There is thus a gap of 24,000 tons which should be filled up by at least two medium sized factories of 12-15000 tons each. This will make India a self suppor-

ting country in the near future. Soda carbonate is required for manufacturing caustic soda also by causticising.

## SODIUM BICARBONATE

For medicinal purposes & for cooking (in baking powders etc.) about 4500 tons are required per annum and in fire extinguishers, about 300 tons are required. Dhrangadhra is manufacturing only about 1500 tons annually and the remaining is met by importing but this can be made locally.

### Sodium sulphide

This heavy chemical was wholly imported into India before the war, like the dichromates. Without any previous experience, in equipment, Indian manufacturer's took up this manufacture boldly and it reflects great credit on their capacity & ingenuity that they have been able to achieve so much in such a short time. In 1938-39 about 1500 tons were imported costing Rs. 18/- to Rs. 30/- per cwt. The estimated production and use in India are given as follows :

1941-42, 3000 tons ; of this 600 tons were used in tanning and unhairing : 2250 tons were used by textiles & 150 tons were used by other industries. In 1942-43, the production was 1850 tons distributed as 600 tons 1050 tons, & 150 tons on the above three industries respectively and in 43-44 about 1500 tons are produced and are distributed in the ratio of 600, 600, and 300 tons respectively on the three industries given above. Didwana in Jodhpur State has natural deposits of sodium sulphate (occurring along with common salt) of a very pure nature. By reducing with carbon, sodium sulphate is easily converted into sodium sulphide. Jodhpur has fitted up 4 furnaces, each with a capacity of  $2\frac{1}{2}$  tons, total 10 tons per day. The sulphide factories are located in Bombay, Calcutta and Agra but these are not yet working economically, the production

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costs being high and not yet competitive. Sodium sulphide surplus can be used in the paper industry and can replace caustic soda to a great extent.

## OTHER SULPHIDES

Barium sulphide, strontium sulphide etc. are also being manufactured in India and are in demand as luminous paints in war days & also in the manufacture of depilatory powders. Barium sulphate is an ore occurring in India and is known as heavy spar and is available cheap. The difficulties in this industry also have been the difficulties of coal supply and transport.

## SODIUM SILICATE (Water glass)

This chemical is being successfully manufactured in India in these days and the production is increasing. This is used as a filler in bar soaps and as an adhesive.

Sodium sulphite and sodium thiosulphate (photographer's "hypo") are also being manufactured in these days and the difficulty of the supply of sulphur is not yet properly solved. Sulphur dioxide as a bye product can also be used for the manufacture of these two chemicals. (For details, see sodium thio-sulphate under S).

## SULPHURIC ACID (see Acid sulphuric)

India needs annually about 30 to 35 thousand tons of sulphur. Recovery of sulphur dioxide from the copper sulphide ores of the Indian corporation ores should be utilised instead of being wasted as at present. With imported sulphur, pre-war price at Rs. 100 per ton, the cost of sulphuric acid per ton came to Rs. 40 per ton. If Indian iron pyrites, available both in good quality and quantity near Simla hills, Bihar and some other places is used, the cost of sulphuric acid goes down to Rs. 27 per ton. In Europe, it is well-known that Spain has the monopoly of iron

pyrites and therefore Spain has great importance attached to it. There is only one factory at Agra, where about 3 tons of pyrites per day are being used for the manufacture of sulphuric acid.

The total number of sulphuric acid factories in India is, Bengal 7; North India 14; South India 2; and Bombay 6: In addition to this 6 factories are producing sulphuric acid for their own consumption, Digboi, 450 tons quarterly, Beraree Coke Co., 300 tons quarterly, Rohtas Industries 360 tons quarterly, Burakur Coal Co., 180 tons, quarterly, Atlas fertilizers 270 tons quarterly and cordite and Kirkee factories 750 tons, quarterly; total 2310 tons quarterly; total No. of factories is 35. The requirements of the acid are 1,15000 tons. Four new contact plants are ordered out from U. S. A. but the efforts have not yet been successful. The Koh-i-Sultan deposits of sulphur have been unearthed from old Geological survey reports and have been worked up during war days as a war necessity. The price of this sulphur, has been said to be 4-5 times that of imported sulphur which is itself  $2\frac{1}{2}$  times the prewar price. In 1943 production of auxiliaries by the sulphuric acid the manufacturers used about 36000 tons of their acid.

The following figures for the production of sulphuric acid in Germany are very instructive. In 1935 Germany produced 1.6 million tons of sulphuric acid (100 %) in 63 factories only. Out of this 30 % was produced by the contact process. The sulphur used was 166,000 tons of local pyrites and 8,22,000 tons of foreign (imported) pyrites, 1,84,000 tons of sulphur dioxide as gases from other roasted sulphides & 1,92,000 tons of sulphur recovered from coal gas purification. The cost of 100 pounds of sulphuric acid (60-66)° Be, in 1936 was 3 to 6 marks (Rs. 2-4-0 to s. 4-8-0). These figures could be used in India as a model for working.

## (H) HIDES & SKINS (SEE LEATHER)

The export of hides and skins from India is a very big industry and can easily be developed in India. The art of working bark tanning is known in India for centuries, thanks to the caste system in India but the modern methods of finishing by as also new methods of mineral tanning like chrome tanning are not known to the hereditary class of tanners known as the Harijan classes. If this knowledge is made available to these classes, there is the easy possibility of converting the raw hides into five times their ordinary export value.

Raw hides and skins are exported on an average worth Rs. 3 to 4 crores of rupees and dressed leather is exported to the value of 5 to 6 crores of rupees. Oilseeds and hides and skins form two of our important exports of raw materials. The following figures are worth noting.

	1930-31	1940-41
Raw hides and skins cow and buffalo hides and goat and sheep skins ...	Crores of Rs 5.1	3.9 Crores of Rupees.
Tanned leather Buffalo, Cow calf, Goat, Sheep	6.3 Crores	7.6 Crores.
Rs. ...	11.4 Crores	11.5 Crores.

A raw hide or skin worth Re. 1/- is worth Rs. 2/- when it is tanned and when it is finished into shoes and other articles it is worth 6 to 10 Rupees. The export of hides and skins should be discouraged.

## ILMENITE

The production of ilmenite is a new industry and is growing in importance.

### Production of Ilmenite in India

1925	1933	1938
tons	tons	tons
328 (first beginning) .	53,000	252,000
	. 51	

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## Insurance (LIFE INSURANCE IN INDIA) Life business.

	<i>Indian Companies</i>	<i>Non-Indian Companies</i>
	Business work	
1921-22	5½ Crores of Rs.	1928 10 Crores of Rs.
1938	47 Crores of Rs.	1939 4 Crores of Rs.

## INCOME

The income from industries is an index of national prosperity in civilised countries. Indian figures compared with other progressive countries show a remarkable backward-ness of India compared with other countries.

(1) Average income from industries—*per head*  
U. S. A. Rs. 100 ; U. K. Rs. 800 : India Rs. 15.

(2) India's economic plight per capita income (Industries and Agriculture).

U. S. A. Rs. 1406 ; U. K. Rs. 980 ; Canada Rs. 1038 ; Japan Rs. 275 ; India Rs. 65.

(3) Income from industries compared to the total income.

U. K. 84·0% ; U. S. A. 80·6% ; India 23%.

## INVESTMENT

Average investment per capita in industries,

Capital	Population	Average per head.
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U. S. A. Rs. 25,000 crores;	13 crores;	Rs. 2,000.
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U. K. Rs. 7,000 crores;	4·5 crores;	Rs. 150.
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India Rs. 700 crores;	39 crores;	Rs. 18.
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In India, out of 700 crores of rupees of total investment, foreign (mostly British) capital is about 100 crores.

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## IRON ORE

Year	Production
1921	... 900,000 tons
1938	... 3,000,000 tons

The bulk of the iron ore is converted into iron and steel in India.

## PIG IRON PRODUCTION

(India excluding Burma)

1932-33	....	1940-41
880,000 Tons	....	1,959,000 tons.

## IRRIGATION

Total area under irrigation.

1939-40		Acres	
British India		Native States	
55,000,000	...	11,000,000	Total area 66
2·6%	...	16%	million acres.

## JUTE PRODUCTION

In India (excluding Burma)

Jute Manufactures

1932-33	...	1942-43
903,000 tons	...	... 1,821,000 tons

1939-40		
No. of mills	...	110;
," of looms	...	68,521 :
," of spindles	...	1,370,000

## KEROSENE

Production in 1932-33, 24,402,000 gallons (Kerosene)

Production in 1932-33, 14,957,000 gallons (Petrol)

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Production in 1940-41:  
Petrol 24,116,000 gallons ; and kerosene, 41,774,000  
gallons.

Per capita consumption of kerosene in India, per  
year (1939-40) is 0.5 ( $\frac{1}{2}$ ) gallon only.

### LABOUR (Industrial labour) in British India.

	1923	1939	1943
Government and local fund fac- tories.	108,200	132,450	355,400
All other factories	1,215,000	1,619,000	2,082,000
Total labour	1,323,200	1,751,450	2,447,400

Of this, the textile industry employs one million (10 lakhs) and gins and presses employ 150,000 ; food, drinks and tobacco industries employ about 284,000 ; engineering industries employ 254,000 ; chemicals minerals and metals employ 93,000 and dyes employ about 85,000 ; Indian States employed in 1940, nearly 300,000 of labourers-in all.

### LEATHER INDUSTRY (see hides & skins).

India is said to have one third of the total cattle (population) of the world, namely 250 million cattle besides 48 millions sheep and goats. India has been the largest supplier of the world demand in hides and skins. India's out-put of this commodity is estimated at about 21 million cow-hides and  $5\frac{1}{2}$  million buffalo hides and 25 million skins (goats, kid and sheep). India stands first in the item of cattle hides and U. S. A. stands second. Out of the 26 million hides and skins, 18% is exported raw, normally. The leather completely tanned in India is said to have gone up to

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three times its pre-war production due to war conditions. This shows the easy possibility of complete tanning being done in India, with a little more training and education to the so called depressed classes.

## LITERACY IN INDIA (of Education)

India stands lowest in the scale of literacy although she is ruled by a civilized Government for over a hundred years! Here are some interesting figures. The literate population of India in 1941 is put down at 38.9 crores. The term literate means such as can read and sign their names! The literates in India were in 1921 less than 15 millions; in 1931, there were 18 millions, and in 1941, there were 43 millions. The percentage of literates was 6% in 1921; and it is now nearly 13% in 1941. This means, the total number of literates in India, is equal to the total population of Great Britain! On the whole, 90% of the rural population is illiterate.

The literacy in British India and in the Indian States is as follows.

### LITERACY (per 10,000).

	1920-21	1931	1941
British India	642 (6.4%)	704	1108 (11%)
Indian States	552 (5.5%)	665	(not available.)

### LITERATE IN ENGLISH (!!) per (10,000)

	1920-21	1931	1941
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#### *British India.*

Males	180 (1.8%)	235 (2.4%)	(not available)
Females	20 (0.2%)	30 (0.3%)	ditto

#### *Indian States.*

Males	89 (0.9%)	135 (1.4%)	ditto
Females	12 (0.1%)	18 (0.2%)	ditto

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## MAGNESIUM CHLORIDE (See Heavy chemicals)

This is one of the heavy chemicals very much used in the weighting of cloth in the textile industry. It is a bye-product obtained from the evaporation of sea-water. At Kharaghoda, in Kathiawar, this is now recovered as a bye-product along with the manufacture of common salt. India is able to produce enough for its own market: even more, it has been even exporting this chemical to foreign countries such as Africa.

### MANGANESE ORE IN INDIA

Manganese ore or pyrolusite is largely used in the manufacture of steel and glass industries. The normal out-put of this ore is a little over one million tons, in British India and Indian states together.

Volume of total out-put (in round figures).

Years	1928-29	1932-33	1938-39
Value in	Rs. 4 crores	2 crores	4 crores
Quantity in tons	1,000,000	200,000	1,000,000

The total production during the year ending 1943 is about 6 lakhs of tons only.

### Export Trade in Manganese Ore

	Year 1928-29	Year 1932-33	Year 1938-39
Quantity in tons	681,000	198,000	519,000
Value in rupees	197 lakhs	48 lakhs	147 lakhs
Average trade per year, per head is Rs. 4/- only.			

### MATCH INDUSTRY IN INDIA

The growth of match manufacture in India is very interesting. Between 1910 and 1920, there were about

25 match factories small and large. The yellow phosphorous bill was passed in 1912, prohibiting the import or manufacture of yellow phosphorous (strike anywhere) matches in India. From 1913-14 onwards, only safety matches were sold in the Indian market. For a few years, phosphorous sesquisulphide matches were being imported into India because like the yellow phosphorous matches, they could be struck on any rough surface and a regular box with a special igniting surface like the safety match was not necessary. Owing to the hygroscopic properties of this new compound (particularly in the Indian monsoon), this match composition did not work successfully and had to be discontinued. For the last ten to fifteen years, the Wimco—(Western India Match Co.) a monster of a Swedish combine of capitalists, with a sprinkling of Indian directors has been established in India and like an octopus, this has practically swallowed most (80%) of the Indian owned factories. Its reputation, elsewhere, in other European countries and in England also is of a similar nature. A real national government of India for Indians would hardly allow such a combine to sweep away Indian industries, with Indian capital.

Excise duty was first levied on the manufacture of matches in India in 1934-35 and it varies from Rs. 2/- to Rs. 4/- per gross boxes, depending on the number of sticks in a box.

In 1940-41, the total production of matches in India was 23,125,000 gross boxes (mostly Wimco's) and in 1942-43 the production was said to be only 15,000,000 gross boxes (also Wimco's). It is interesting to note that due to war necessity, the least suited variety of wood, viz. *Bombax malabaricum*-(*simal*) is being used and further local glue has also been used. In pre-war days, aspen, spruce and other varieties of timbers were imported from Sweden and Siberia

for the use of splints. The pre-war price of 1 gross boxes of matches was Re. 1/- only (in 1933) and today's price is nearly Rs. 3-4-0 per gross. Taking the total population of India at about 38 crores, the average consumption of matches per head is about 2 match-sticks for three days or 2/3 of a match-stick per day, whereas in Europe, it is mostly 6 to 10 match-sticks per day per head. If smoking tobacco is a sign of civilization, (like the drinking of alcohol), India is not even one eighth as civilised as Europe. During the war days, Indian matches were available in the English market! The income from the excise duty on matches in India is nearly 2 crores and 25 lakhs of rupees.

### MICA

(Total trade for India excluding Burma and Indian states.)

India is supposed to produce 80% of the world's output in Mica. The best mica mines are located in Behar in Hazaribagh and are now said to be under Government supervision. The total production is estimated as follows. In 1918-19 it was 1500 tons whereas in 1938-39 it rose to 6000 tons.

### Volume of Export in Mica.

	1928-29	1932-33	1940-41
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Quantity in tons	...	4890	2000	7200
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Value in Rs.	...	90 lakhs	32 lakhs	108 lakhs
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Per head of the population roughly, it is only worth As. 0-4-0 per year.

### MILK.

Milk is one of the most important articles of food for vegetarian India. The annual milk production in India (before the war) was estimated at 9.6 crores of Bengali maunds. According to one authority the average milk consumption in India is estimated at 900 million gallons of milk. This gives an average

of 24 lbs. per head per year only. According to another authority the prewar production of milk was 22 million tons (23,000 million litres) of milk. Allowing 15% for the needs of calves, this gives a daily intake capita of 6 ozs. per day assuming all the milk is used for *drinking* only which is, however, not correct. In the different provinces of India, the intake of milk per capita varies very widely. In the Punjab, it is estimated at about 18 ozs. per head per day, whereas in Madras the land for rice, chilies, tamarind and buttermilk, it is only  $3\frac{1}{2}$  ozs. per head per day.

It should be remembered that out of the total supply of milk, nearly 60% of the milk produced is used for ghee making, therefore the actual intake of milk as such must be hardly  $2\frac{1}{2}$  ozs per head per day.

In 1943, the total production of milk was estimated to be 36000 lakhs of maunds, only.

During the last five years of the war, a large number of milch cattle must have been butchered to supply fresh meat to the fighting armies—apart from the sheep and goat similarly butchered. In cities like Bombay, Calcutta and others, milk cannot be had even at 3 lbs. per rupee. In these days, therefore, an oz. or, two per head, per day, would be a liberal estimate for the intake of milk in average India. Compare some of the prewar-figures of India with other civilised countries, Switzerland has a record of 70 gallons, England has 31 gallons and India 8.5 to 12 gallons per head per year. In India the cow is religiously worshipped and in Europe it is scientifically and mercifully butchered. And yet this pitiful situation! In the war days, cattle were sold, it is said, at Re. 1 per lb.

### MILLETS IN INDIA

The millets, like jowar, bajra, arhar etc. are the poor man's food stuffs for starches and proteins. These crops are also of value because they supply fodder to the cattle. Jowar and bajra are cultivated over an

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area of about 51 million acres. Roughly about 18 (eighteen) million tons of millets are produced every year in India. Yield per acre is about 500 lbs.

## MINERAL OILS

(See petrol and kerosene for India).

The total mineral oil production of the world is as follows. In 1860, only 70,000 tons were produced. In 1936, it rose to 250 million tons. During the war, it is said to have gone up to nearly three times as much.

In India, in 1940-41 the production of kerosene was only 41,800,000 gallons and petrol was 24,116,000 gallons. (See kerosene).

## MOTOR VEHICLES IN INDIA

The total number of motor vehicles registered in India is as follows :

	1928	1932	1938
No. of cars	129,000	190,000	160,000

Roughly, this means an average of one car for every 2700 members of our total population.

U. S. A. is supposed to have one car for every five or six families.

## MORPHINE AND STRYCHNINE

Pre-war production of morphine in India was only 200 to 300 lbs., in 1941, it was 1000 lbs. For strychnine, India is one of the largest manufacturers viz. 15,000 lbs. per annum.

## OIL SEEDS

India has a very big trade in the line of oils and oil-seeds, like hides and skins. She commands an important place in the world trade. The exports of oil-seeds from India were as follows :

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In 1939-40, it was worth Rs. 11.9 crores and in 1940-41 it was worth about 10 crores of rupees.

In 1940-41, in British India leaving aside ground nuts and linseed, the other oil seeds are distributed as follows :

British India	Indian States
1940-41	1940-41
acres 9,720,000	1,600,000
Yield per acre (in lbs.)	Field per acre (in lbs.)
342	210
Yield in tons in 1942-43 1483,000	149,000

The yield of ground nuts, for 6 million acres of cultivated area was about 3 million tons and of linseed for an area of 3 million acres was of the order of half a million tons. By 1939, India has become first among the ground-nut exporting countries of the world. The world production of linseed, an important oil for paints and varnishes is estimated at 2 million tons, of which 50% comes from Argentina and 25% comes from India. The total area for all oil seeds in India comes to about 16.5 million acres.

### OXYGEN AND DISSOLVED ACETYLENE

The first factory for oxygen was started in India about 20 years ago. Before the war, there were factories at Calcutta, Lahore, Bombay, Jamshedpur and Kargoli. Since 1940, about nine new factories have been added. Like the Associated Cement Combine of India, this industry also has a big combine organised in 1935 under the name, Indian Oxygen and Acetylene Co. Ltd. which has got a virtual monopoly. In many hydrogen and electrolysis factories where hydrogen is used (and *oxygen can also be used*), the factories are given a certain amount per month by

this combine for allowing the oxygen to escape into the air, instead of collecting it for industrial purposes to keep up the syndicate prices of the oxygen! In 1938, oxygen worth Rs. 14.2 lakhs and dissolved acetylene worth 4.5 lakhs of rupees were produced. In 1943, Oxygen worth Rs. 29 lakhs and dissolved acetylene worth Rs. 20 lakhs were produced. The acetone used is produced at Aruvankadu, Nilgiris and calcium carbide is imported. The Birla Bros. in Calcutta are planning to start a carbide factory for which there is a great demand in India.

### PAINTS AND VARNISHES

India is one of the biggest producers of linseed oil used for boiled oils and also shellac so largely used for polishes. There is a very great field in India for manufacturing paints and varnishes for export trade also.

The first paint factory in India was started in 1902. By 1937, the production of paints was 20,000 tons and in 1938, it was 24,740 tons. This was only 60% of India's requirements. In 1942, the production of paints and varnishes was 30,000 tons of which 80% was supplied for war work. India has to import certain gums and resins from outside for making these paints. The number of paint and varnish factories in India is as follows: (a) Calcutta circle 22; (b) Bombay circle 28; (c) Karachi and the Punjab circles 6 and (d) other areas 6; the total number being 62 factories.

### PAPER

There is plenty of raw material available in India for the manufacture of paper of all types. Only the forest department has to be taught to use and develop its resources with a view to promote industries instead of merely being "Conservating" as hitherto. Grasses, Bamboo and the Himalayan varieties of pines, poplars,

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spruce, aspen are all very suited for this industry. There are a number of well established factories in different provinces of India, some of the oldest being Titagarh, Bengal Paper Mills, Lucknow, Mundhwa, Travancore etc. There are half a dozen new factories started during the last seven or eight years.

The first protection was granted to paper industry in India in 1925 ; later a duty was imposed on the import of paper pulp into India.

Before the war, (1939-40), the imports of paper into India were as follows ; newsprint 30,000 tons ; paper board 25,000 tons ; other kinds 40,000 tons ; total import of paper was 100,000 tons and paper pulp was also imported to the extent of 17,000 tons, therefore altogether 117,000 tons of paper and paper pulp were imported. Between 1925 & 1931, India was producing the following ; bamboo pulp 2000 tons, grass pulp 10,000 tons ; imported wood pulp 17,000 tons. There are in all 12 big paper factories in India and they produce in all 90,000 to 100,000 tons of paper. Newsprint is not manufactured in India and the whole of it, nearly 50,000 tons, has to be imported.

Taking the total amount of 100,000 tons of paper produced in India for a population of 38 crores of the population, the average consumption of paper per head per year comes to about 10-12 ozs of paper or 1 oz per month. For contrast, the figures for Japan would be interesting. In 1942, Japan produced 1,650,000 tons of paper pulp, that is 16 times as much as in India.

## PENCILS

The use of paper and pencils is an index of the spread of literacy in a country. The use of lead pencils and its manufacture is just growing. There are in all about a dozen pencil factories in India just struggling

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for existence. India has been using annually 4,000,000 dozens of pencils worth about Rs. 20/- lakhs. For the total population of India, we are using 48,000,000 pencils. This means an average of one eighth of a pencil per head per year ! Literacy indeed !

## PETROL

Petrol is an important article, both in times of peace and more so in times of war. The world production of petrol is estimated 22 crores of tons. Of this, Americas' share is 80% ; Englands' share is 2% (40 lakhs of tons) and India's share is 0.15% (3 lakh of tons) !

In 1938 mineral oil production in Digboi (Assam) was 6 crores of gallons. In 1940-41, India produced a total of 24,114,000 gallons of petrol. The recent production of petrol in India is estimated to be about 83 million gallons whereas India needs about 400 million gallons.

## PHARMACEUTICALS AND DRUGS

This is entirely a new line for India. No educational institutions exist in India (excepting some recently introduced in three or four Universities) for teaching this subject. During war days, due to private enterprise, India has been producing a number of pharmaceuticals. The following figures are quite interesting and encouraging :—

Year	Medical stores purchased in India	Imported drugs.
1938-39	Rs. 15,81,000	Rs. 2,20,54,000
1940-41	Rs. 104,45,000	Rs. 2,17,70,000
1942-43	Rs. 3,48,50,000	Rs. 1,47,10,000

If only the present policy of (*compulsory*) aid to industries is continued, very soon, India can not only

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do without imports but can also export these drugs to foreign countries. The rich and valuable organic pharmaceutical kingdom of India has just been touched and needs further investigation. The above figures are encouraging. An Indian Ayurvedic Pharmacopeia is at once needed.

### PLY WOOD

In the line of ply wood manufacture also, India has shown remarkable progress. In 1938-39, ply wood laminated boards worth Rs. 12 lakhs and tea-chests worth Rs. 90 lakhs were imported. Before the war, there were only three factories, two in Assam and one in Malabar. At present, there are, thanks to the world war, 27 factories with a potential production capacity of 97 million square feet per annum. It is expected that in 1944, India will have produced about 60 million square feet of ply wood. The factory at Sitapur is one of the best equipped in the line and produces even the resinbonded marine and air, craft quality. The raw materials required are any type of wood and a binding material like glue or much better casein or a similar protein. A peeling machine and presses are all that are required by way of machinery and an intelligent mechanic is quite competent to look after the few mechanical operations of peeling, glueing and pressing.

### POPULATION

The total area of India is 1.9 million square miles.

The total population of British India including Burma in 1931 was 27 crores, the ratio of the males to females was 14 : 13 ; and ratio of the rural population to urban was nearly 8 : 1. The population of Indian States was nearly 8 crores and there again, the ratio of males to females was 42 : 39 and the ratio of the rural to the urban population was also 8 : 1. Ex-

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cluding the population of Burma, the total population of India in 1931, therefore, was 33.8 crores. The population of India in 1941 was as follows :—

British India, 29.6 crores for the whole of India. ??

For the years 1870-1930, (60 years) the following increases of populations are recorded for the following countries.

U. S. A. 125%

Russia 115%

Japan 113%

England 77%

and India 31%

The density of population in different countries is as follows :—

In India, per 247 acres, 245 people are living and working.

In England per 247 acres, only 30 people are living and working.

In Canada per 247 acres, only 11 people are living and working.

Nearly 88% of the population in India is living in 700,000 villages. The population dependent upon agriculture in India is 67%, in England it is 7% and in U.S.A. it is 22% and the average for this in the civilized countries of Europe is 33%. The population employed in industries is U.K. 47%; U.S.A. 32% and India has only 10%.

It should be noted that the accuracy of the census figures for 1941 is highly disputed both logically, biologically and statistically. The figures for the population of all the frontier provinces such as N.W.F.P., Punjab, Bengal and Assam do not stand the scrutiny of statisticians. The congress minded public refused to cooperate with the Government

census authorities for political reasons and certain communities in these areas, on the other hand, were enthusiastic in swelling their numbers of enumeration also for political reasons. The plus minus increase in population, the influx due to immigration of population from one province to another and the corresponding decrease in certain provinces due to the exodus and the average increase in population and what is most important the absence or destruction of records of *sample and ad hoc surveys* have all confirmed that the figures for the census for 1941 *cannot be taken* as reliable.

Post-Office Savings Bank  
Deposits and Depositors.

1921-22      1939-40      1942-43

No. of Depositors 1.8 millions; 4.8 millions; 2.5 millions;  
Amount of

deposits      Rs. 22 crores; 88 crores; 52 crores;

It appears, that during the war days, the depositors have withdrawn their savings and the number of depositors has decreased. The savings of a people in post offices and banks represents the stamina to resist a famine and show its purchasing power!

### POTTERY AND PORCELAIN.

This industry has not flourished so well as it ought to have. There are in all about 36 factories in the different provinces of India. The industry is, however, gradually progressing and in the war days, it has received a great push. The important factories are located at Nagpur, Calcutta, Raniganj, Jubblepore, Tatanagar, Gwalior, Bangalore, Morvi, Than Road, Delhi, Talegaon, Kundra, Lahore, Benares etc. For crockery, insulators etc., the Calcutta Pottery works is one of the best equipped and possesses a few of the most up-to-date tunnel ovens. Bangalore has a

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furnace heated by electricity. Stoneware, sanitary, ware, tiles, crockery etc., are all being made of a fairly good quality. High class porcelain, chemical porcelain etc. have yet to be manufactured. The total production is estimated to be worth over 50 lakhs of rupees.

Than Road in Kathiawar has grown to be a big centre.

### POWER (Electrical).

The total electrical energy generated is estimated to be 2650 million units in 1941-42 and of this 2360 million units were sold. Of this, again 66% was used for industrial purposes and 12% only was used by electrical railways.

For industrial purposes, the output of power was as follows :—

1938-39	1941-42.	1943-44.
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1200 million units; 1630 million units; 2896 million units.

The following average of units used per head gives comparative idea of the industrial development in different countries:

Norway; 2250 units per head (1921).

U. S. A.; 880 units per head.

U. K.; 500 units per head.

Argentine; 176 units per head.

India; 7 units per head.

Of this 7 units, in India, 4 is hydro-electric and 3 is of other sorts. The total available electric power in India is estimated to be about 20 million H.P.

The average per capita working power, including motive power dependent on steam, oil, gas or water power of India measured in horse power hours compared with U.K. and U.S.A. is as follows :—

U.S.A. 13.38 ; U.K. 6.65 ; and India 0.47.

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## QUININE.

The imports of quinine and quinine salts in 1941-42 were worth Rs. 60/- lakhs as against Rs. 30/- lakhs in 1940-41. In 1941-42, the imports of quinine salts were 174,000 lbs. whereas in 1940-41, the imports were 100,000 lbs. The stock of quinine in India was as in April 1944, 244,000 lbs. Of this, for civil population, 200,000 lbs. were said to be available. Actually what quantity was being distributed for the civil population and how much was reserved for the army and the defence purposes is not known. Regarding the deaths due to malaria and the annual toll taken by this disease due to shortage of quinine, in reply to a question by Mr. R. Sorenson, Mr. Amery replied, "It is not possible to give reliable figures of deaths in India specifically attributable to malaria nor to estimate to what extent they might have been reduced by greater use of quinine." Mr. Amery, perhaps, thinks death is such a common occurrence in India that no importance need be attached to death due to malaria, alone, nor to any effects that quinine might produce in lowering this particular death rate! The science of statistics has no use for subjects like deaths due to malaria plague or cholera or to un-employment in a vast country like India!

## RAILWAYS

The total mileage of railways in India was about 42000 miles (1939-40). In the war days, some of these railways have been removed and sent out of the country to the middle east to meet war demands. In 1942-43, the total mileage was 40,525 miles. In 1923, this mileage was 36,350 miles. In 20 years, therefore, the increase was 4000 miles, only an average of 200 miles per year for a total area of 1.9 millions square miles, an annual increase of 0.1% per sq. mile. The number of square miles and number of

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people served by one mile of railway in India and in three other civilised countries are given below :—

	Miles of Railway	Sq. Miles	No. of persons served by 1 mile of Railway.
U.S.A.	246,000	15	536
U.K.	20,000	4½	2286
U.S.S.R.	51,000	160	3351
India	41,000	39	9512

The following figures show the poor progress made by the railways during the last 20 years.

	1923-24	1932-33	1942-43
	lakhs	lakhs	lakhs
Gross earnings.	Rs. 103,65	92,74	167,88
No. of passengers carried.	millions	millions	millions
	532.6	480.7	620.4
	millions	millions	millions
Volumes of goods traffic.	tons	tons	tons
	68.7	7.2	95.3

The average velocity per hour of even the broad gauge system (5 ft. 6 inches) has remained so ridiculously steady and so slow during the last 20 years, that whereas in foreign countries even a gauge of 3 ft. 6 inches gives an average velocity of 40 miles an hour, in India, even a gauge of 5 ft. 6 inches (50% more) hardly gives an average of 30 miles. It is high time that the Railway administration changed hands.

## RICE

Rice production in India from 1910-11, to 1942-43 has remained steady between 25 million tons and 27 million tons. The area under cultivation for rice has been in 1938-39, 73.8 million acres; in 1942, it was 75 million acres and in 1943 it is 80 million acres. In

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1943, the production of rice was about 3 crores of tons for a population of over 38 crores. Therefore, a ton of rice, (2240 lbs.) is available, per year, for every 13 people in India. Imports of rice from Burma into India were about 2 million tons. Taking into account the Indian production and the imports of rice into India from Burma etc., the average available quantity of rice per head in India is about 8 ozs. per day. The normal production of rice in Bengal, a rice producing province was expected to be 3 million and 40 thousand tons in 1943-44, and, yet, Bengal is a land of the worst peaceful (divine) famines that the world has ever seen.

About 4.5 million acres of rice land were brought under cultivation for improved varieties, under the "grow more food" campaign during the war days! This had no perceptible effect on the total production. Actually the output declined by 10% as between 1920-21 and 1940-41. We expect that the yield of crops in India should increase without giving to the lands the manures that are essential, as against the rest of the world, just as we wish to increase the yield of milk from cows by the use of pedigree bulls only without giving them the food they need so badly.

## ROADS

### Roads in India (excluding Burma)

The mileage of roads in India is as follows :—

	Metalled	Un-metalled	Total.
1928	58461	135,824	194,285
1932	73665	182,447	256,112
1937	77266	225,617	302,883

No figures are available after 1937. Imagine a vast country like India with only about 78,000 miles of metalled roads !

## RUBBER.

The total capital invested in rubber industry in India is estimated at about 4 to 5 crores of rupees. In 1939, only about 7000 tons of raw rubber were used in Indian factories, out of a production of 14,000 tons of raw rubber. Today, in India, 80-90% of the rubber is used in the factories mostly for the production of motor tyres. The Dunlop factory was established in 1935 and Fire-stone followed in Bombay in 1939. In all, there are about 115 rubber factories in India and the recent rubber consumption is estimated at about 20,000 tons. From the time, the Malaya peninsula was lost to the allies, both the rubber production and distribution are under Government control. The total area under rubber cultivation in the far east is over 8 million acres, the rubber production is about 1.4 million tons and the investment is one billion dollars. The area, in India, under rubber cultivation is 10,000 acres and the production is only 20,000 tons. Synthetic rubber is being produced in U. S. A. to the extent of 1.5 million tons and the U. S. A. has spent about 750 million dollars on the experiments only. Natural rubber is about 1/3 to 1/4 as cheap as synthetic rubber. When the war is over, there will be an over production of natural and synthetic rubbers. Indian production of rubber for the year ending December 1942 was estimated at 16,000 tons.

## SALT.

Salt is one of the commonest necessities even of the poorest man and as such is a state monopoly in every modern state. Every body has to contribute to the state in proportion to his abilities and as such it is a handy article for a state to levy a duty on and to collect the income. Indirectly, therefore, every citizen pays for the maintenance of the state, in the form of salt tax.

The excise duty on salt has been varying from time to time in India to suit the Government of India budget. From 1888 to 1903 it was Rs. 2/8/- per Bengali maund ; in 1903, it was Rs. 2/- per md. in 1905, it was Re. 1/8 : in 1907, it was Re. 1/- : in 1916, it was Re. 1/4 : in 1923, it was again Rs. 2/8; in 1924, it was Re. 1/8; and in Sept. 1931, it was raised to Re. 1/9 per md. The customs duty on imported salt was the same as the excise duty prior to 1931. An additional customs duty of Rs. 4/8 per md. was levied on imported salt from 1931 onwards. In March 1933, this was reduced to Rs. 2/8 per md. In April 1936, it was further reduced to Re. 1/8 per md., while the excise duty remained the same. In 1940-41, the income from the excise duty on salt was Rs. 10.5 crores of rupees. The total salt consumption in 1938-39 was made up of Indian salt, 1,540,000 tons. Aden exported to India 300,000 tons and imports of 332,000 tons were made from Europe (valued at Rs. 37 lakhs), thus making a total of 2,172,000 tons. This works upto an average of a little less than  $\frac{1}{2}$  oz., per head per day. The world production of salt in 1938 was estimated at 32,211,726 metric tons. Taking the world population in 1938, at 1800 million souls, this works upto an average of 40 lbs. of salt per head per year for all purposes (including industrial uses). The same average for all uses in India works to 11.2 lbs. per head, per year.

### SHELLAC.

Shellac, (like natural indigo, at one time) is a monopoly product of India. The modern synthetic resins like bakelite are shaking this monopoly and like synthetic indigo which has knocked our natural indigo out of the world market, our shellac, also, is in great danger. During war days, for munition purposes, for gramophone records, and for making polishes etc., shellac is very much in demand. Our annual production of shellac is of the order of 50000 to 52000 tons. The

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synthetic resin powders have the property of being thermoplastic and can therefore, be easily used for manufacturing all sorts of fancy articles.

The comparative prices of shellac and synthetic resin powders are given below :—

	Aug. 1939, per cwt.	Aug. 1941 per cwt.
Cellulose acetate moulding powder	187/Sh.	317/Sh.
Spirit soluble phenol resins for lacquer	87/Sh.	104/Sh.
Phenol moulding powders	65/Sh.	93/Sh.
T. N. Shellac (Indian)	35/Sh.	65/Sh.

Attempts are being made at the shellac research institute, Ranchi, to make the best possible use of shellac and see how it can be made thermoplastic. Not much success has yet been achieved.

### SILK (natural and artificial).

In 1937, natural silk production in India was estimated at about 600,000 lbs. In 1943, Kashmir, Bengal, Mysore and Madras together produced about 300,000 lbs. In 1944, the production is estimated at about 400,000 lbs. and in 1945, it is estimated to go upto 1,000,000 lbs. During the last four years of the war, all the silk is under Government control and has been used for the manufacture of parachute cloth and cords, for which natural silk alone is used. Artificial silk does not possess the necessary strength and other properties. The silk handloom industry in Benares, Shrinagar and other places has been suffering immensely as the weavers do not get either natural or artificial silk.

India is not manufacturing any artificial silk (rayon), yet India imported in 1937, artificial silk worth Rs. 5.3 crores and staple fibre worth Rs. 13.6 lakhs, the

total being Rs. 5.4 crores of rupees. According to an authoritative estimate, the world production of rayon and staple fibre has reached the figure of 1,725,000,000 lbs. Of this, Japan's share was 500,000,000 lbs. i.e. nearly 30%. India needs a large supply of carbon disulphide, a solvent used in this industry. India can be a big centre for starting this rayon manufacture. In 1939-40, the total amount of rayon used amounted to 48 millions of lbs. worth about Rs. 4.8 crores. India can use upto 330 million lbs. of rayon.

**SKINS.** (See Hides and Skins, and  
Tanning and Leather).

### **SOAP.**

Soap industry in India has been steadily gaining ground. It must be said to the credit of soap manufacturers, in India, that they are able to make in India soaps of the finest quality. In spite of the foreign competition, the quality of the soap made in India is steadily gaining ground. India is rich in its supply of oils and fats and the modern hydrogenated oils can replace the imported tallow (from Australia) to produce durable and slow wearing soaps. The only difficulty is an adequate supply of caustic soda which is under the control of Imperial Chemical Industries. As soon as I. C. I., Tatas and Mettur begin to supply the demand locally, India can be a soap exporting country. During the war days, the demand for soap should have gone up by about 1/2 a crore of rupees but instead, it seems to have gone down due to the limited supply of caustic soda which had to be rationed. As a result, (a) Lever Bros., (b) Tomco, (c) Godrej. & (d) Swastik (the big combines) are said to have got the lion's share of the caustic soda to meet the defence demands first (and also the civil demands so far as possible) where-as some small concerns, catering for the civil market had to close down.

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Soap manufacture is carried on, very largely, on the cottage industry basis and these concerns, for want of caustic soda, had either to close down or causticise soda ash with slaked lime to produce their own lyes. The pre-war production of soap in India is estimated (with the free import of caustic soda) at about 150,000 tons of soap annually. In 1943, it was only about 90,000 tons and in 1944 it is estimated to go upto 130,000 tons, distributed as follows; Bombay, 50,000 tons; Madras, 27,000 tons; Karachi, 22,000 tons and Calcutta 31,000 tons. The capacity of Lever Bros. (an English concern), the biggest concern of its kind, is estimated to be about 20,000 tons per annum and Tomco also one of the biggest is said to have a capacity of 15,000 tons. In all, there are over 50 large factory units in India making soap on a large scale.

Soap is one of the essential items contributing to the sobre civilization of a country. It is an essential attribute of sanitation in all its forms and is a better index of the moral prosperity of a nation than the use of alcohols, liquors and wines. Particularly is this true for a backward country like India where for example, as in the case of the remote Himalayas, two articles are badly needed (even more than literacy), namely soap and quinine salts. As such, the comparative figures for soap for India and other countries would be very instructive. The total quantity of soap used in India, pre-war, including foreign imports was 21,00,000 of mds., (75,000 tons) worth about Rs. 4/- crores. From this, the average consumption of soap per head, per year comes to 1/2 a lb., or 2/3 ozs. per month (per head!).

## WORLD AVERAGES (For 1937-38)

U. S. A.  
Holland

Population:

12 crores.  
0.85     ,,

Average per head  
per year.  
25 lbs.  
24     ,,

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Germany	6. 5	,	21	"
Great Britain	4. 5	"	20	"
France	4. 2	"	20	"
India	38. 0	"	1/2	" (8 ozs.)
China	32. 0	"	1/8	" (2 ozs.)

India, for once, is not the lowest on record at least in one article, namely the use of soap. China has snatched away the laurels !

One threatening aspect of this industry is that foreign concerns are coming into India and establishing their huge scale factories in this country similar to what is happening in the case of match and rubber industries.

Indian capitalists have to be naturally watchful about this and the Indian National Government cannot be indifferent to this either.

### SODIUM SULPHITE, SODIUM THIOSULPHATE, METABI-SULPHITE AND HYDRO-QUINON (Heavy Chemicals).

Before the war, there was hardly any production of these chemicals in India. During the war days, small plants have been put up in India and have supplied the Indian requirements to a large extent. The present production is estimated to be as follows, annually ; sodium sulphite 300 tons ; Sodium thio-sulphate 800 tons. At present sulphur and soda ash required for these industries are to be imported. Soda ash will be soon manufactured in India in sufficient quantities and sulphur will have to be imported. The manufacture of these chemicals in India is still another example of Indian achievement, during war. At Khewra Indian Soda ash is being manufactured, at the rate of 100 tons per day.

### STARCH AND DEXTRINE.

Both, these industries are newly springing up in India, in the war days. It is very well known that imported starch from U. S. A. and other countries is

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being dumped into India and sold in the Indian market at prices, even below the cost of production in the land of its origin. It should be remembered that whereas starch and dextrine are sold at very low prices, its derivatives used largely in the textile mills are sold at very high prices (to make up the losses in the starch sales). This is exactly what the Germans did after the war of 1918 with regard to their dye-stuff industry. Wherever, there is competition, kill it and where there is none, prosper with high prices—is one of the laws of trade of big combines.

The following are the imports of starch and dextrine.

	1930-31	1939-40
Starch and Dextrine	438,096 cwts.	768,826 cwts.
Price in	Rs. 34,41,000	Rs. 70,00,000 lakhs.
Customs' duty at 20% extra		duty at 20% extra.
	Total Rs. 41.5 lakhs.	Total Rs. 85 lakhs.
average price Rs. 9 per cwt.	average price Rs. 11 per cwt.	

Starch is produced in India in about 8 big factories mostly from maize. The daily production is estimated at about 75 tons. Therefore the annual production is about 22,500 tons. The maximum capacity in one factory is estimated to be about 30 tons daily. In 1944, therefore, India has been able to produce 50% of its annual needs and the production will easily go up as soon as the restrictions on the use of maize corn for starch manufacture are removed. India can easily be self-supporting in its national supply of starch and dextrine. The only requisite is, all foreign dumping of cheap starch should be counteracted by a protective tariff. The industry built up in India in the war days reflects great credit on the Indian manufacturer who is left to his own resources in times of calamity and is not attended to in days of normal prosperity.

## STEEL.

Steel, sugar and cement are three industries of India's pride. All these are growing and are an example of Indian enterprise, given a suitable opportunity. The total world production of steel is estimated at 180 million tons. The production of steel in India was 600,000 tons in 1932-33 and in 1940-41 it was 1.3 million tons. The production of steel in U. S. A. (with a population which is 1/3 of Indian) was 43 million tons, before the war and has gone up to 90 million tons as a result of the war. Finished steel in India in 1940-41 was about 925,000 tons. Per head of the population, in India, steel production comes to only about 8.4 lbs, whereas in U. S. A., it is 1500 lbs. per head per year. The preparedness for war and peace of U. S. A. and India and the comparative prosperities of these two countries are in the ratio of 1500:10. Indian pig iron is exported to England for steel manufacture,

## SUGAR.

Sugar is one of the splendid examples to show how, given a little protection an industry can prosper. The Government of India was not quite prepared to lose the customs revenue so quickly and therefore when quite beyond its expectations the industry began to grow in Behar and U. P., an excise duty on the local production in India was levied to make up for the loss of income in the sugar customs. This is a novel way of encouraging an industry.

The imports of sugar in India were on an average, between 1910-40, 7,30,000 tons valued at 12.71 crores of rupees. The total area under sugar cane cultivation in India was about 4.6 million acres and of this, the area under improved cane cultivation (in 1938-39) was only 2.7 million acres. The number of sugar factories in India in 1932-33 was 57 and after the sugar protection

act of 1932, by 1940-41, it rose to 147. The total production of sugar, direct from cane was 1,050,000 tons and the average percentage of sugar recovered from the cane rose to 9.8% in 1940-41 as against about only 7% only a few years ago. The production of sugar cane in 1924-25, was less than 30 million tons; in 1936-37, it was more than 67 million tons an over production for the year, and by 1939-40, it was 48 million tons. In 1937, the International Sugar Conference controlled by the League of Nations succeeded in parcelling out the world market with the cooperation of all important sugar producers and exporters with the exception of Japan. The share of India was restricted as was done in the case of rubber production in India in the world market.

The average consumption of sugar in the different provinces of India is roughly as follows; Bombay, 17 lbs. per head per year (due to tea-drinking habit.), U. P. 7.1 lbs. per head per year and Behar and Orissa, a sugar producing province only 3.0 lbs. per head, per year. The excise duty on factory sugar is Rs. 3, per cwt. and on Khandsari (cottage scale) sugar is As. 8, per cwt. The sugar output in India in 1943-44 was 1.3 million tons. The production of raw sugar (Gud) in 1939-40, was 4 million tons; that is about 25 lbs. per head per year. The consumption of raw sugar (Gud) and crystalline sugar together comes to about 5.3 million tons for the whole of India. The sugar industry employs about 100,000 workers and 3000 graduates in about 150 factories. The daily average intake of sugar raw and pure together works at about 1.3 ozs., per head per day.

The world production of sugar is estimated at about 32 million tons in 1938-39 and of this beet-root sugar was about 2 million tons. The per capita consumption of sugar in different countries is given as follows (1937-38);

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Australia, 117 lbs; U. K. 111 lbs; Canada 103; U. S. 115 lbs; Italy 20 lbs; Ireland, 90 lbs. Germany 60 lbs. and France 55 lbs.

The main draw-backs of our sugar industry are the following; compared with sugar cane producing countries like Mauritius, Java etc., the yield of sugar cane, per acre in India is not even half of what it is in other countries and further in provinces like U. P. and Bihar or Punjab, the season for sugar cane crushing is limited from 4 to 6 months only. The best plot in Bombay yields 100 mds. per acre. The whole of the Deccan plateau is nicely suited for sugar cane cultivation because of its very temperate climate. The total capital invested in sugar industry in India is estimated at about 35 to 40 crores of ruppes.

The following figures for rationing of sugar during war days are instructive. The figures are for supplies promised (!) per week, per head. In India, these are only theoretical figures because supplies are distributed *if and whenever available*.

Per week.

		Jam, Honey etc., unrestricted.
India	9 ozs.	
Canada	8 ozs.	4 ozs
U. S. A.	8 ozs.	unrestricted.
Britain	8 ozs.	4 ozs
France	5 ozs.	If available.
Germany	8 ozs.	6 ozs
Netherland	9 ozs.	4 ozs
Norway	7 ozs.	2 ozs
Switzerland	4 ozs.	2 ozs

The latest figures for sugar distribution show that the citizens of Bombay and Calcutta have a sugar ration of 39 lbs. per annum when available while those of Delhi have  $32\frac{1}{2}$  lbs. Other places in the country have varying quota still lower. The military authorities have

their own way. The British serviceman gets 80 lbs per annum plus extra quota in canteens while his Indian-brother-in-arms gets in all a quota of 55 lbs. According to medical experts, the average annual minimum consumption of sugar should be 90 lbs per head or 4 ozs per head per day whereas Indias' annual average is 8 lbs. only.

## SUPERPHOSPHATES (see Fertilizers)

The world production of superphosphates is estimated at about 15 million tons. In normal times India imports from outside about 7000 tons and manufactures in the country about 3000 tons. India needs several thousands of tons of phosphates for each one of its crops like sugar, wheat, rice. The local crops, not meant for export have hardly shown any prosperity for decades together. If the fertility taken away from the soil is not given back to it, it would be a miracle if the soil still remained fertile. Thanks to the manures supplied, other progressive countries are giving crops three to four times the Indian yields per acre.

India exports annually about 25000 tons of bones and bone meal worth about 30 lakhs of rupees. These can give large supplies of bone fat gelatine and superphosphates. Phosphate rocks are available in Trichnopoly district. Superphosphates are being made from bones, in Delhi, Madras and Calcutta. Basic slag is available from Duplex plant of Tata Iron and Steel Co., to the extent of 4500 tons. The slag contains 7% of phosphoric acid of which 60-70% is soluble in citric acid. This can be used as a source for superphosphate manufacture. Indian population is increasing and the lands must be manured, increasingly to meet the growing food demands. Otherwise famines will be a permanent feature.

## TANNING.

### Tanneries in India and tanning (bark and chrome).

The number of tanneries in India working on a factory scale is about 35. Of these, the U. P. circle has got 18 in all (Cawnpore alone having about 15), Madras having 4, Bengal circle has 3, the Punjab circle has 5, and Bombay has 1. This is a very important industry for India because this country is one of the biggest suppliers of hides and skins in the world market, one lb. of raw hide or skins costs roughly, As. -/12/- to a rupee, tanned leather makes it worth Rs. 2/- to Rs. 3/- (sold by sq. area) and leather goods make the same thing worth Rs. 6/- and more.

Chrome-tanning is a valuable branch of tanning and needs specially trained labour. Ordinary bark-tanning is a centuries-old established industry in India and has been handed over from father to son, thanks to the caste-system in India.

About a dozen factories in India are engaged in chrome-tanning and nearly 2.1 million hides have been chrome-tanned during the year 1943. Madras has been doing the export trade in chrome-tanning worth Rs. 6/- crores (six crores) in 1939-40 and Cawnpore has been a big centre for internal trade. In Calcutta, it is interesting to note that Chinese are doing chrome-tanning on a cottage scale and are supplying the civilian demand.

This industry can best be developed by the so called depressed classes as this is an uninviting industry and as the saying goes, "these classes have the tanners' blood in them". This will be of great help in improving the status of the depressed classes.

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## TEA.

The following are the figures for the production of tea in India.

	1920-21.	1940-41.
Area in acres	652,000	738,000 acres.
Total yield in lbs.	322 millions	421 million lbs.
Yield per acre in lbs. (lbs.)	494 (lbs.)	571 lbs.

The consumption of tea per capita, per year is only 0.27 lb. The total output of tea for the year ending 1942 is estimated to be 27,000 tons (564 million lbs.).

## TELEPHONES.

	1923-24.	1943-44.
No. of telephones	37,000.	106,000 telephones. (for a population of nearly 40 crores).

Rental from telephones increased from Rs. 82 lakhs to Rs. 384 lakhs in twenty years. On an average, there is one telephone for every 4,000 of the Indian population.

## TOBACCO.

The production of tobacco in India was 491,000 tons in 1938-39 and went down 431,000 tons in 1942-43. The acreage under tobacco was about 13 lakhs of acres in 1941-42 and 11.4 lakhs acres in 1942-43. The average yield of tobacco is about 740 lbs. per acre.

## TRADE (Import and Export).

The following are some typical figures for the total import and export trade of India :—

Export.	Import.	Total.
1929-30 Rs. 350 crores.	Rs. 250 crores	Rs. 600 crores.
1939-40 Rs. 220 crores.	Rs. 180 crores	Rs. 400 crores.

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In 1934-40, for a total population of nearly 38 crores, the average per capita trade comes to about Rs. 11/- per year or less than Re. 1/- per month.

## UNEMPLOYMENT.

The following is an official reply given by Mr. Amery (in the course of a parliamentary debate) in reply to a question put to him; in January 1944. "The provinces of India do not keep any statistics of unemployment". The members should be informed that *the provinces also do not keep* any as he said he imagined". This needs no further comment.

## VEGETABLES.

The intake of vegetables in India is estimated at an average of 3 ozs., per head, per day and this, in a country which is 'par excellence' a vegetarian country. For a safe and healthy minimum, this must be at least six(6) ozs., per head, per day. The use of fruit must be included and encouraged in the vegetarian diet. Otherwise, there will be a degeneration of the body, only the soul will remain.

## VEGETABLE GHEE.

The production of the so called vegetable ghee or Vanaspati is estimated to about 300 tons a day or 100,000 (one lakh) tons annually. Schemes are afoot to increase the production of this to nearly three times as much. In India, mostly ground nut oil or cotton seed oil are used for hydrogenation which-ever is cheaper. This is treated with di-acetyl which is a synthetically prepared butter aroma. As vitamins are added certain shark (fish) oil derivatives. By hydrogenation, oleic and linoleic acids (liquid) are converted into stearic (solid) acid and the digestibility and assimilability are very much reduced by this change. In addition, some oleic acid (liquid) is

changed into its isomer, iso-oleic acid which has a high melting point (45°c). and worsens the digestibility. Altogether, the substance is being sacrificed for the mere imitation and look of natural ghee. The pure refined oils ought to be certainly better for the human system than the hydrogenated "Vanaspatti".

### WEIGHT and (average).

The average weight of an Indian is an important national consideration. The daily needs of food of an individual are largely dependent on the average weight and surface, average foot pounds of work done and the differences between the body temperature and the surrounding temperature. There is not much of published data on this subject. The following is some available data. An average Indian weighs 120-125 lbs. An average college student weighs 110-115 lbs. An average Indian woman weighs 90-95 lbs. An average European male weighs 150-155 lbs. An average European female weighs 120 lbs, and an average Japanese male weighs 120 lbs.

### WHEAT.

The average yield per acre of wheat in India is (1940-41) 685 lbs. On the whole, there is a slight improvement in the yield of wheat per acre whereas there is hardly any progress in the case of the yield of rice. The farmer is too poor to pay for the necessary manures. Even the cow-dung does not go back to the soil in the form of green manure. He needs it for his daily fuel as he can not afford to buy wood or charcoal. The total output of wheat was 6 million tons in 1920-21, and it was 8 million tons in 1940-41. For the last few years, a small protective duty has been levied on the import of wheat from outside (mainly Australia).

About 10% of the total area under cultivation is devoted for wheat. Indian wheats are generally soft

(W)

and weak. In 1933-34, there was the largest wheat acreage viz. 36 million acres but the yield did not come upto the record harvest of 1930 which was over 10.5 million tons. Recent crops have a yield of average 2.5 million tons which is only slightly above the internal requirements.

In 1939-40, India exported 7760 tons of wheat. The total area under improved varieties of wheat is a little over 7 million acres. ~~On the whole about 10 million tons of wheat is a little over 7 million acres.~~ On the whole about 10 million tons of wheat are available in India for a population of 38 crores. This means an average of 60 lbs. per head per year or about 5 lbs. per head per month. Reduced to a daily average, this means 3 ozs., or  $7\frac{1}{2}$  tolas per head per day. It should be noted that in South India, wheat is used on holidays and rice takes the place of wheat which is taken in North India (where rice is a food only for the invalids).

## WIRELESS RECEIVER SETS.

The number of wireless sets in a country is undoubtedly a sign of literacy, enlightenment and civilization as contrasted with the use of tobacco and alcohol. The following figures are quite instructive as an index of this progress.

1927-28 1930-31 1936-37 1942-43 April 1945,

No. of Wireless sets	3600	7719	37,800	176,000	200,534
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For a population of 38 crores assuming an average of six individuals to a family, there will be over  $6\frac{1}{2}$  crores of families. Therefore, there will be roughly one wireless set for about 360 families! Bombay leads (in 1945) with 45,663 sets and Bihar and Orissa has the lowest viz. 6626 sets.

(Z)

## WOOLLEN INDUSTRY.

Thanks to the temperate and warm climate prevailing in certain parts of India, woollen articles are not such an absolute necessity as cotton textiles all over India. The following is the number of woollen mills etc., in British India and Indian States.

	1936-37		1939-40	
	British India.	Ind. States.	Br. Ind.	Ind. St.
No. of Mills	34 +	5 =	39;	37 + 4 = 41
No. of Looms	1750 +	207 =	1957;	1800 + 183 = 1983
No. of Spindles	57,000 + 11,000 = 68,000		71,000 + 10,500 = 81,500	

Before the war, the total capital invested in this industry was nearly 2.5 crores. The biggest factories are located in Cawnpore and Dhariwal (due to climate demands). The total number of mills is 17. The indigenous production was about 4 million lbs., before the war and the imported articles were nearly 12 million lbs. During the war, 15 mills are working on 100% production basis for war work only. Todays' full time production is 15 million lbs. Only small quantities are released for civil use.

## ZINC CHLORIDE (see Heavy chemicals).

This is one of the heavy chemicals largely in demand for the textile industry, dry cells etc., but zinc is not available in India as a raw material. Therefore, the prices have gone upto three or four times the pre-war value. Indian imports before the war were about 3500 tons annually.

Tata chemicals are expected to put on the market annually about 1000 tons. Three or four other concerns also (Bengal Chemical, Shambhu Nath etc.) will also be producing enough to meet the Indian demand as soon as zinc is available in quantity. U.S.A. has got nearly 35% of the world production of zinc and zinc derivatives.

## APPENDIX

### A. ACID (Nitric).

Synthetic nitric acid obtained by the oxidation of ammonia is manufactured in two factories, at Kirkee and at Aruvanakadu, for the manufacture of Nitro-glycerine and Cellulose-Nitrate. Each unit is said to have a capacity of ten tons. Besides this, many factories are making their own nitric acid by old methods for their local needs. This quantity is estimated at about ten tons per day. It is to be seen whether the Government Units at Kirkee and at Aruvanakadu will continue to work when the war is over.

### ACID OXALIC

This acid is used mostly as a mordant. In the saw-dust method, one hundred parts of saw-dust are fused with three hundred parts of caustic soda and caustic potash in equal parts at a temperature of 200° to 240° C. The yield is about 40% on the saw-dust used. The latest scientific method of preparing oxalic acid is by heating sodium formate with a little caustic soda at 400° C. whereby sodium oxalate is formed. Since formic acid is prepared cheaply by the synthetic method, this new method has become a commercial possibility.

### ALUMINIUM

In India, 90% of aluminium is used for domestic utensils. Three concerns in Bombay and two in Calcutta are only pressing aluminium wares. Indian bauxite is rich to the extent of nearly 63 % of aluminium oxide and the reserves of the ore are of the order of 250 million tons. Canada, India's great competitor, has to get all its bauxite from South America.

It is interesting to note the present round about method of manufacturing aluminium in India, adopted by the India Aluminium Coy., Ltd. The plan adopted is to produce alumina from bauxite at Ranchi, near

(A)

the ore deposits, to convert alumina into ingots of aluminium at Always by using the cheap power produced at Pallivasal Works in Travancore High ranges and to roll the ingots into various shapes in their mills at Belur near Calcutta because of the big market there! At present, the alumina is imported! The second and third operations are done in India.

### **ANTIMONY**

Small deposits of Antimony are available in India in Lahoul (Spiti) and Chitral. The ore has to be carried by mule or by man over long distances including mountain passes. The Star Metal Spelter Coy. of Bombay worked a refinery with a capacity of 220 tons a year.

### **B. BALL-BEARINGS**

India needs annually about four lakhs of ball-bearings of nearly 2500 different varieties. This small demand does not justify the erection of one large scale factory. Only small scale factories on the Japanese model should be erected till the demand rises appreciably.

### **BOLTS, NUTS & RIVETS**

The total consumption in India for this class of goods is about 50,000 tons annually. Of these, during the war, India has been able to manufacture nearly 25000 tons, the remaining half has to be imported from U.S.A.

### **C. CHINA CLAY**

China clay is an important item in the production of all sized articles, such as cloth, paper, etc. This can be easily produced in the country from our existing natural deposits of clay all over the country, by a simple process of washing and lixiviating. Annually, about 30,000 tons of this have to be imported. Imports in 1938-1939 amounted to nearly thirty thousand tons valued at about Rs. 15 lakhs. The production of this

(C)

article in India (in 1936) amounted to about 17000 tons. The production of china clay in India from the deposits in Bengal and Travancore is on the increase.

## D. DRY BATTERIES and CELLS

In the year 1936-37, dry batteries and cells were imported into India to the value of nearly 96 lakhs of rupees. Imports of batteries for flash lamps were worth Rs. 25 lakhs. Three important factories, one in Calcutta and two in Bombay are manufacturing these and it is expected, with a little protection, they will be self-supporting. The manufacture of the carbon electrodes of all sizes is a difficult problem and is being tackled with success in India during the war days.

## E. ELECTRIC CABLES

The pre-war production of rubber-insulated cable wires in India was only about seven million yards but in 1943, it rose up to twenty million yards.

## ELECTRIC FANS

In 1936-37, the imports of electric fans were worth Rs. 35 lakhs and in 1940-41, they were worth only Rs. 14 lakhs. Before the war, there were 7 firms making fans in India and during the war, 8 new firms were started. Before the war, the Indian production of fans was roughly as follows 30,000 ceiling fans and 5,000 table fans. In 1941, the number of electrical fans produced was about 57,500 and in 1944, the production is expected to be 60,000 ceiling fans and 30,000 table fans. One factory alone, the India Electric Works is said to manufacture about nine thousand table fans.

## ELECTRIC FITTINGS

Tumbler switches, plain, with single pole, with fuses for train lighting, plugs, wall sockets are being made out of three materials, bakelite, copper and brass. Six old factories in Calcutta, Lahore, Bombay and Bangalore are manufacturing these and during the war, four new

(E)

concerns are started at Bombay, Cawnpore and Calcutta. The plastic powders are all imported except in one at Bhadravati, where a small unit of about one cwt. is being worked with partly local raw materials.

## ELECTRICAL GOODS

During the war, black adhesive tapes, conduit pipes and D class signalling cables have been newly manufactured in India.

## ELECTRIC LAMPS

India needed before the war, about 14 million of these bulbs of which 11 million came from over seas. Nearly 70% of the vacuum lamps came from Japan only 15% of the gas filled ones were Japanese. Before the war, 3 million bulbs were made (assembled !) in India. In 1944, India's production is expected to go upto about 5 million bulbs of which Government is said to have taken about 3 millions of the average price of Re. 1/- one each. It is interesting to note that the glass shells and the brass caps are being made in India successfully during the war days. The present production of India, manufactured in about ten factories all over India, is able to meet only one-third of India's total demands which will be of the order of twenty million bulbs! During the war, all the factories are under Government control. The tungsten filaments, molybdenum wire, lead wire and gases like Argon, Nitrogen are all imported and hence the handicap for expansion.

## ELECTRIC MOTORS

In 1938-39, the imports of electric motors were worth Rs. 63 lakhs. Before the war, only 200 motors worth Rs. 40,000 were made in India. During the war, six different concerns at Calcutta, Bombay, Kirloskarwadi, Amritsar and Coimbatore produced (in 1943) nearly ten-thousand motors worth about twenty lakhs of rupees. The out-put is expected to be nearly doubled in 1945. In 1940-41, the imports of motors were only worth Rs. 32 lakhs.

(E)

## ELECTRO-PLATING

Electro-deposition of metals like nickel, copper, tin, cadmium, and zinc are all being successfully done in India. Hard chrome-plaiting of steel components, a very important and difficult process has been successfully worked in India and has helped the war work. All the salts and anodes needed are being made in India. This industry should now be able to hold its own against imported articles.

## ESSENTIAL OILS

India is exporting annually about fifty lakhs of rupees worth of essential oils and is importing about the same quantity of foreign synthetic perfumes used for hair oils, soaps, and cosmetiques. The Indian oils exported are distilled under vacuum and their active constituents are re-imported into India to be sold at high prices. Efforts are being made in India successfully to stop such imports and to use the Indian oils in the proper and scientific manner. The manufacture of synthetic perfumes is a very important industry and should be taken up early. Indian Sandalwood oil holds a very prominent place in exports of our essential oils and is a Mysore State monopoly.

## (F) FERRO-ALLOYS.

The demand for ferro-chrome is about 500 tons and that for ferro-silicon is about 4000 tons. The Mysore furnace will produce about 2000 tons only, and the remaining will have to be imported. Ferro-chrome is mostly imported. Ferro-tungsten is said to be successfully made in Jamshedpur (48 tons) in 1943-44. Ferro-vanadium is expected to be made in Mayurbhanj state. Ferro-molybdenum is said to be imported from U.S.

## G. GOLD.

According to a recent estimate, in 1943, the production of gold in India is said to be 252,200 ozs. of fine gold.

## IRON AND STEEL

The quantity of steel made in India at the beginning of the war was about 7,50,000 tons and nearly 2,00,000 tons or so were imported and thus the total consumption was nearly one million tons. The total value of Indian steel production is estimated to be worth Rs. 15 crores, India's place being about tenth in the scale of nations ! Pig iron used and exported is said, to be worth about four and a half crores of rupees. In 1941, according to Government control, 70% was reserved for Government use and 15% was meant for railways and only 15% was left for civil demands. During the war years, the production of pig iron is said to go up from 17 lakhs of tons to twenty lakhs and steel from 7.5 to about 12 lakhs of tons. During the war, special steel for rails, waggons, axles, armour plates, springs, acid steel, alloy-steels for bridges, stainless-steel etc. have all been made in India. Many of these were looked upon as foreign monopolies and India was considered incapable of producing these. Tatas, at Jamshedpur, are largely responsible for this achievement. The absence of water transport lack of cheap coal and electricity and cheap transport are causes which hamper the prosperity and growth of this industry. Nearly two and a half lakhs tons of coal were used by this industry only.

## JUTE INDUSTRY

In 1943-44, the production of jute manufactures in India is estimated to be about 9,40,000 tons.

## LANTERNS & LAMPS

In three factories located at Calcutta, Ogalewadi and Dumraon, nearly 60,000 lanterns are being made per month. For want of tin, they are being lacquered with a black enamel which has stood quite well.

## LEAD

The imports of lead (in 1942-43), were about 22,000 tons. A small lead smelter has been started in Behar.

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There is a great paucity of this ore in India. Deposits of this ore in Zawar and Jaipur are being examined.

(M)

### MINERAL OIL

The average production of petroleum in India for 1927 to 1938 was of the order of 6.6 crores of gallons of which Assam wells contributed about 5.7 crores of gallons. The Dhulion oil field produced in 1944 about 1.4 crores of gallons and Khaur field produced nearly 10 lakhs of gallons. The oil field of Joya Mair is said to have produced only one million gallons. Altogether, in India, in 1944, the total production of oil is said to be about 8.3 crores of gallons. India's total needs of this commodity are estimated to be nearly 40 crores of gallons. At present only 20% of our needs are met by local production. It is complained that the rules of the Indian Mines Act (re. la-bour) are not enforced in spite of the recommendations of the special commission appointed for the purpose. The production of liquid oils by the process of liquefaction of coal, by the synthetic methods can be and should be taken up in the coal fields.

(P)

### POWER SUPPLY

According to the estimate of the Geological Survey of India, the potential reserves of India's power supply are estimated at 27 million Kilowatts of which only half a million (less than 2%) are developed so far.

(S)

### SALT

In 1942-43, the production of common salt was 2.03 million tons and the imports were only 2,32,000 tons thus making a total of 22,62,000 million tons.

(S) SECONDARY BATTERIES.

Imports of accumulators (in 1938-39) were worth about seven lakhs of rupees. Two factories, one in Bombay and one in Calcutta, are being worked under Government control and one factory in Mysore is working independently for producing secondary batteries.

## SILK

According to one official source, the production of natural silk in India, in 1943, is estimated to be about 1.5 million lbs. of raw silk.

## STEEL CASTING & WIRES

It is expected that about ten thousand tons of steel castings will be made in India, in a recent year. The Indian Steel Wire products produced about 50,000 tons of billets for wire-products etc.

## SULPHUR.

During the period of the last war, India ran absolutely short of supplies of sulphur. The records of the Geological Survey of India were unearthed and old deposits of historical antiquity were taken up for working. The sulphur mines situated on the borders of Baluchistan and Persia in the Spezand area were mined and the sulphur obtained was supplied to the Indian market. Apart from the serious transport difficulties, the scarcity of water supply was a serious handicap. A good deal of the sulphur was lost in the mining area itself, due to ignition and other causes. The maximum production of sulphur was estimated at 3000 tons a year although the actual recovery was only half of this. This source is now likely to be given up as the difficulties are very great.

## (T) TAPES (Adhesive)

Black adhesive tapes are used for insulating electric connections. Before the war, not a foot of this was made in India and although so petty in nature, it is so very essential for all electrical connections. It is estimated that this industry started only during the war will put on the market an out-put of about 40 tons worth about Rs. seven thousand per ton which is equal to our peace-time demand. This is a key industry for electricity and is now completely Indian, everything required being made in India.

(T)

## TEA

The production of tea in India for the year ending 1942 is estimated to be about 564 million lbs.

## TIN

The Indian consumption of tin, metallic, per annum before the war was about 2500 tons. During the war, by strict control, it was reduced to about 1600 tons in 1943. In Konnagar, a small refinery was started for tin smelting of Indian residues.

## TIN PLATE

Before the war, India imported 50,000 tons of tin-plate. During the war, India produced in 1944 nearly 80,000 tons of tin-plate according to one source. The total demand for this article in India in 1937-1938 was nearly 60,000 tons of which Indian production was 53,000 tons and about 7,000 tons were imported.

## TRADE OF INDIA

Year 1941-42; Imports, Rs. 173 crores; Exports Rs. 253 Crores.  
Year 1943-44; Imports, Rs. 119 crores; Exports Rs. 210 Crores.

## TRANSFORMERS

The pre-war production of transformers in India was only 60, worth about Rs. 60,000. In 1944, it is estimated, India will have produced about 1500 transformers worth about Rs. 15 lakhs. There are three big concerns producing these, one at Bombay one at Calcutta (both these being sister concerns of foreign firms) and one at Bangalore which is an Indian concern.

(W)

## WOOL.

The production of raw wool in India according to one estimate is said to be about 90 to 100 million lbs. of raw wool in the year 1943.



